THE

PROCEEDINGS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY

OF

LONDON

Series B

TAXONOMY

VOL. 22

LONDON:

PUBLISHED BY THE SOCIETY AND

SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

1953

PRINTED IN GREAT BRITAIN BY
ADLARD AND SON, LIMITED,
BARTHOLOMEW PRESS,
DORKING, SURREY.

CONTENTS

PAGE

ANANTHAKRISHNAN, T. N., B.Sc. A new species of Thrips, *Thilakothrips fimbriata* sp. n. (THYSANOPTERA-TUBULIFERA) from South India 33

BALFOUR-BROWNE, J., M.A., F.R.E.S. *Hydrodessus* gen. n. *Hydroporinarum* (COLEOPTERA : DYTISCIDAE) 55

BENSON, ROBERT B., M.A., F.R.E.S. A revision of the genus *Fenella* Westwood (HYMENOPTERA : TENTHREDINIDAE) 136

BOX, HAROLD E., F.R.E.S., F.R.G.S. New Crambine genera allied to *Diatraea* Guilding (LEPIDOPTERA : PYRALIDAE).—I 178

BUXTON, P. A., C.M.G., F.R.S., F.R.E.S., and BARNES, H. F., M.A., Ph.D. British DIPTERA associated with fungi. I.—Gall midges (CECIDOMYIDAE) reared from the larger fungi 195

COLLIN, J. E., F.R.E.S. A new species of *Rhamphomyia* Meigen (DIPTERA : EMPIDIDAE) from Morocco 57

COUCHMAN, L. E., F.R.E.S. Notes on some species of *Oreixenica* Waterhouse and Lyell (LEPIDOPTERA : SATYRIDAE), with descriptions of new forms 73

EASTON, A. M., M.B., F.R.E.S. A second Australian species of *Meligethes* Stephens (COLEOPTERA : NITIDULIDAE) 214

FERRIÈRE, CH., D.Sc., F.R.E.S. Notes on two genera of ENCYRTIDAE new to Britain (HYMENOPTERA : CHALCIDOIDEA) 1

FRASER, Lt.-Col. F. C., I.M.S.(retd.), F.R.E.S. Notes on the family GOMPHIDAE with descriptions of a new species and the female of another (ODONATA) 189

FRASER, Lt.-Col. F. C., I.M.S. (Retd.), F.R.E.S. Further notes on Samoan Odonata belonging to the Ischnurine complex of species, with descriptions of two new species and some unknown females 119

FREEMAN, PAUL, M.Sc., F.R.E.S. Two new species of Psychodidae (DIPTERA : NEMATOCERA) from Britain 69

FREEMAN, PAUL, M.Sc., F.R.E.S. CHIRONOMIDAE (DIPTERA) from Western Cape Province—I 127

FREEMAN, PAUL, M.Sc., F.R.E.S. CHIRONOMIDAE (DIPTERA) from Western Cape Province—II 201

GUILLARMOD, C. JACOT, F.R.E.S. Preliminary notes on African TIPHIIDAE (HYMENOPTERA) 15

KEVAN, D. KEITH MCE., B.Sc., A.I.C.T.A., F.R.E.S. A new species of *Tenuitarsus* I. Bolívar, 1904, from the Sudan (ORTHOPTERA : ACRIDIDAE : PYRGOMORPHINAE) . 41

KOCH, C., F.R.E.S. The TENEBRIONIDAE of Southern Africa. XI : new Epitragini and Cryptochilini from the British Museum 155

LINDROTH, CARL H. Kirby's types of North American CARABIDAE (COLEOPTERA) . 167

LUMSDEN, W. H. R., Ch.B., F.R.E.S., and VAN SOMEREN, Mrs. E. C. C. Records of *Culex* species (DIPTERA : CULICIDAE) from West Nile District, Uganda, with notes on their behaviour 19

MATTINGLY, P. F., B.Sc., F.R.E.S. A change of name among the British mosquitoes (DIPTERA : CULICIDAE) 106

MESNIL, L. P. A new Tachinid parasite of an Embiopteron 145

MILLER, N. C. E., F.R.E.S., F.Z.S. A new species of *Lucretilis* (ORTHOPTERA : ACRIDIDAE) from Malaya 142

MÓCZÁR, L. On the species of *Cryptocheilus* Panzer (HYMENOPTERA : POMPILIDAE) . 35

MURPHY, D. H. A new littoral *Proisotoma* (COLLEMBOLA : ISOTOMIDAE) from the Clyde area 103

OLDROYD, H., M.A., F.R.E.S. A new Nycteribiid (DIPTERA) from Nigeria . . 59

OMER-COOPER, JOYCE, B.A., Ph.D., F.R.E.S. Some new species of DYTISCIDAE (COLEOPTERA) from the Cape Province of South Africa 23

PARAMONOV, S. J. A note on the group *Ligyra* (*Hyperalonia* olim) *venus* Karsch (DIPTERA : BOMBYLIIDAE) 220

PAGE

PARROTT, ARTHUR W. A new genus and species of EUPHORINAE from Australia (HYMENOPTERA : BRACONIDAE) with a note on its feeding habits by B. B. GIVEN, F.R.E.S. 164

RAO, V. PRABHAKER, M.A., D.Sc. Some new Diaspine scale insects from India . . 61

RICHARDS, O. W., M.A., D.Sc., F.R.E.S. Two new African species of *Ceroptera* Meigen (DIPTERA : SPHAEROCERIDAE) 5

SATCHELL, G. H., Ph.D., F.R.E.S. New and little known Samoan PSYCHODIDAE (DIPTERA) and a new species from Rarotonga 181

STROYAN, H. L. G., M.A., F.R.E.S A new account of *Aphis compositellae* Theobald (HEMIPTERA : APHIDIDAE) 109

STROYAN, H. L. G., M.A., F.R.E.S. Notes on some species of *Dysaphis* Börner, 1931 (HEMIPTERA : APHIDIDAE) 95

TOTTENHAM, The Rev. C. E., M.A., F.R.E.S. A new species of *Philonthus* Stephens from Africa (COLEOPTERA : STAPHYLINIDAE) 139

VAN HILLE, J. C., Ph.D,. F.R.E.S. Note on *Formicomus rufescens* Pér. (COLEOPTERA : ANTHICIDAE) and revision of the species of *Formicomus* with red prothorax in South Africa 9

VAN HILLE, J. C., Ph.D., F.R.E.S. The genus *Formicomus* (COLEOPTERA : ANTHICIDAE) in H. C. Dollman's collection from N. Rhodesia 147

WILTSHIRE, E. P., F.R.E.S. Middle East LEPIDOPTERA. XII.—Two new species from South-west Persia (Iran) 217

WITTMER, W. 5. Beitrag zur Kenntnis der MALACODERMATA Afrikas . . . 85

BOOK NOTICES.

Clegg. The freshwater life of the British Isles 22

Common names of British insect and other pests 60

Cook. The ants of California 200

Daglish. Name this insect 8

Forster and Wohlfahrt. Die Schmetterlinge Mitteleuropas 68

Frick. A generic revision of the family Agromyzidae (Diptera), with a catalogue of New World species 72

Linssen. Nature interlude. A book of natural history quotations 8

Michener and Michener. American social insects. 213

Osborn. A brief history of Entomology. Including time of Demosthenes and Aristotle to modern times with over five hundred portraits 72

Peters. A provisional check-list of the butterflies of the Ethiopian region . . 32

Raignier. Wat leeft en groeit de wereld van dieren en planten 200

Roeder. Insect physiology 144

Rothschild and Clay. Fleas, flukes and cuckoos 32

Smart and Taylor. Bibliography of key works for the identification of the British fauna and flora 144

Snodgrass. A textbook of arthropod anatomy 54

Staniland. The principles of line illustration 213

van Steenis. Flora Malesiana 31

Wirth. The Heleidae of California 68

GENERAL INDEX 223

NOTES ON TWO GENERA OF ENCYRTIDAE NEW TO BRITAIN (HYMENOPTERA : CHALCIDOIDEA).

By Ch. Ferrière, D.Sc., F.R.E.S.

I have received from Dr. O. W. Richards two very small but very interesting species of Chalcidoidea of the family Encyrtidae, obtained in England from Coccids. The Encyrtidae form a large family, 112 genera being already known in Europe. In England little has been done on this group since Walker's work more than a hundred years ago. Waterston studied and named several species of Encyrtidae in the British Museum, but his published work deals largely with exotic species. The European Encyrtids are mainly known from the monographs of Mayr in Austria, Thomson in Sweden and Mercet in Spain.

This note is a small contribution to our knowledge of the British fauna, both species, as well as their genera, being new to Britain. One belongs to a large genus, *Xanthoencyrtus* Ashmead, containing many species from North America, Hawaii, Australia, and a few from Europe. The other belongs to the genus *Aphycoides* Mercet, with a single species from Spain, and is here described as new.

Xanthoencyrtus Ashmead, 1902.

Mirastymachus Girault, 1915 ; *Pholidoceras* Mercet, 1918.

A good description of the genus has been given by Mercet (1928). It is distinguishable mainly by the yellowish coloration of the body, at least in the females, the more or less depressed thorax, especially after death, the hyaline wings, which are often short or rudimentary, the punctiform marginal vein and the very short post-marginal vein ; the males have the antennae with elongate funicle segments with long ciliae, scattered or verticillate, and the sixth segment bears a row of very small sensorial organs. Both sexes have the mandibles with only two teeth, a character on which Ashmead based the subfamily Ectrominae.

But this character is often difficult to see, even in microscopical preparations, and small species may easily be confused with species of the genera *Coccidencyrtus* Ashmead and *Neococcidencyrtus* Compere, which have three teeth on the mandibles. All these genera have similar antennae. *Neococcidencyrtus poutiersi* Mercet, from the south of France, closely resembles the British species in its coloration and short wings, but differs in the number of teeth on the mandibles. The genus *Adelencyrtus* Ashmead (*Epiencyrtoides* Girault) has also some similarity, but has four-toothed mandibles, longer marginal vein and dark body.

On the basis of bidentate mandibles and the row of sensorial organs on the last funicle segment of the antennae, Mercet has described several species in this genus of which the males only are known. One of these was a single short-winged male, collected in Spain on grass in a wood, *Pholidoceras semiaptera* Mercet, 1921. *Pholidoceras* is considered as a synonym of *Xanthoencyrtus*, although in 1928 Mercet retained the former name for a subgenus for those

species having the antennal club of the female with three segments, the true *Xanthoencyrtus* in that sex having only a two-segmented club. The males received from England do not differ from the description of the Spanish *semiaptera*, and although it may appear difficult to identify a British species with a species known only from Spain (of which only a single male is known), I see no reason to separate them.

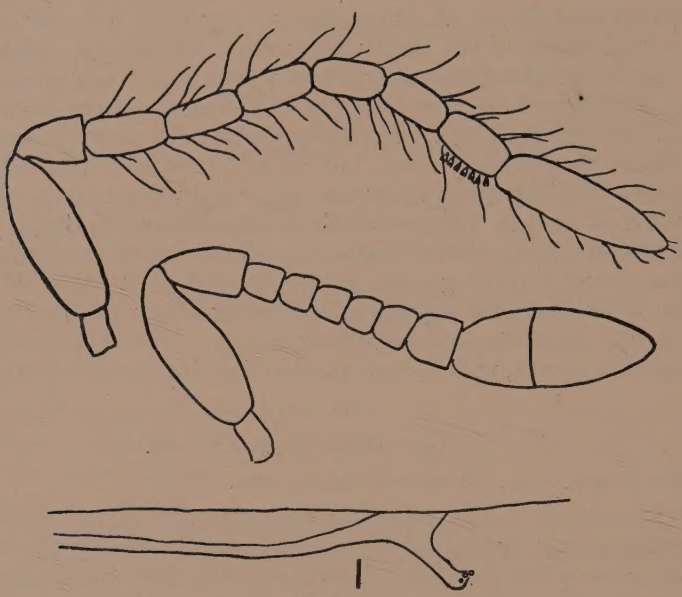


Fig. 1.—*Xanthoencyrtus semiapterus* (Mercet). Antenna of male, antenna of female, and wing-nervure.

Xanthoencyrtus semiapterus (Mercet).

♂.—Black, only the base of the face and the legs yellow. Body depressed. Antennae with the scape short, oval, the pedicel scarcely longer than broad, the funicle segments about twice as long as broad, with few scattered ciliae, the last segment with a row of six to eight small scale-like sensorial organs. Wings long, much longer than the abdomen, submarginal vein reaching the margin of the wing before the middle ; marginal vein punctiform, stigmal vein short, narrow, postmarginal vein almost wanting. Wings often rudimentary, narrow, reaching only to the apex of the scutellum. Abdomen short oval, not or scarcely longer than the thorax.

♀ (*new*).—Body entirely orange-yellow, only the front margin of the mesonotum sometimes darkened ; eyes brown ; antennae with scape and pedicel yellow, the three first funicle segments black, the fourth brownish, the fifth and sixth yellow, the club black ; legs entirely yellow. Head flattened, seen from in front rounded or short oval ; eyes large, their inner margins parallel, cheeks short. Mandibles with two teeth of about the same length, ocelli forming a very low triangle. Antennae inserted just above the mouth ; scape short, not reaching to the ocelli ; pedicel a little longer than broad ; the four first funicle segments very small, rounded or slightly broader than long, the sixth largest, subquadrate ; club with two segments, as long as the five preceding segments together or almost as long as

the funicle. Thorax much depressed, finely shagreened, almost smooth. Mesonotum slightly broader than long, scutellum rounded behind ; axillae narrow, their inner angles in contact ; propodeum very short, especially in the middle. Wings as in the male, either long and normal or short and rudimentary, reaching to the apex of the scutellum. Abdomen depressed, a little longer than the thorax, pointed behind, the ovipositor scarcely protruding.

Length : 0·5–1·3 mm.

BERKS : Silwood Park, vi.1949 (*K. Boratynski*). Bred from a Coccid, *Ripersia* sp. on *Deschampsia caespitosa* (Gramineae).

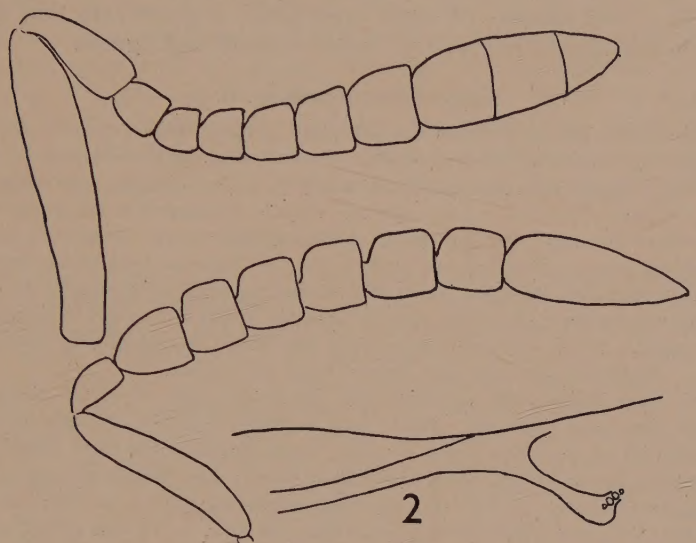


FIG. 2.—*Aphycoides merceti* sp. n. Antenna of female (above) ; antenna of male (smaller enlargement) and wing-nervure.

Aphycoides Mercet, 1921.

This genus was described as a subgenus of *Aphycus* Mayr and based on a single male found on *Pinus halepensis* near Madrid, Spain. The type, *A. matritensis* Mercet, is well characterised by its peculiar antennae, with large and broad funicle segments. Later, in 1923, Mercet published a note on *Aphycoides*, after studying males and females received from Ruschka. He is now of the opinion that " the females have no relation with the genus *Aphyces* (sens. lat.) . . . they belong better in the same group as the genus *Encyrtus* (now called *Microterys*) and must be placed there, although this group contains no other genus with the last abdominal tergites transverse."

Ruschka's specimens had been obtained in Sweden from *Physokermes abietis*, and Mercet gave descriptions and figures of both males and females under the name of *Aphycoides* sp. He was in doubt about their identity as they could not be easily compared with the single male of his *A. matritensis*, this male being mounted on a slide. He mentioned only that they were darker and had the eyes more pubescent. The British specimens, bred also from *Physokermes abietis*, are certainly identical with the Swedish specimens described by Mercet, and I am of the opinion that, when a type cannot be clearly examined,

the validity of a species must be based on its description. The males from England differ in many features from the male of *A. matritensis* ; not only is the body darker and the eyes more ciliate, but the antennae have the scape narrower, the funicle segments relatively broader and longer, the second and third segments scarcely broader than long (in *matritensis* they are twice as broad as long), the axillae are more transverse, not as long as broad at the base, the propodeum almost entirely smooth and the abdomen much narrower and shorter than the thorax (not as long as head and thorax united).

Based on these differences I consider the specimens from Sweden and England as a new species. A short description is given here, but for more details reference should be made to Mercet's study and figures.

Aphycoides merceti sp. n.

♂.—Body black, almost without metallic sheen ; face, cheeks, pleurae and sternum yellowish-brown. Antennae brown, darker above. Legs yellowish-brown. Abdomen entirely black. Eyes oval, densely ciliate, ocelli in a low triangle. Antennae inserted level with the base of the eyes ; scape narrow, slightly broadened in the middle ; pedicel not broader than the scape, one and a half times longer than broad ; funicle segments much enlarged, about twice as broad as the pedicel, the first segment broadening from base to apex, a little longer than its apical width, the succeeding segments somewhat broader than long, the last subquadrate, club solid, hardly narrower, about as long as the three preceding segments united. Wings elongate, longer than the body ; marginal vein short, but not punctiform. Abdomen narrower and shorter than the thorax.

♀.—Body dark bluish-green, antennae and legs brown, apex of middle tibiae and the median and hind tarsi yellowish. Head, seen in front, rounded, the face inflexed, the antennae inserted on the sides of the clypeus ; scape reaching the front ocellus, narrow, pedicel elongate, two and a half times longer than broad ; first funicle segment as broad as the pedicel, subquadrate, the following segments increasing slightly in width and length ; the last segment one and a half times broader than the first, club about as long as the four preceding segments together. Mesonotum broader than long, shagreened ; scutellum rounded at apex, slightly more shagreened-punctate than the mesonotum. Wings as in the male. Abdomen shorter than the thorax, rounded or slightly broader than long.

Length : 0·9–1·3 mm.

Berks : Sunninghill, 30 ♀ and 12 ♂ obtained from the Coccid, *Physokermes abietis* (*K. Boratynski*).

Type deposited in the British Museum.

References.

Ashmead, W. H., 1902, The Hymenopterous parasites of *Phenacoccus cavalliae* Ckll. *Canad. Ent.* **34** : 301–302. (*Xanthoencyrtus.*)

Girault, A. A., 1915, New Genera of Chalcidoid Hymenoptera. *J. N.Y. ent. Soc.* **23** : 165–173. (*Mirastymachus.*)

Mercet, R. G., 1918, Generos nuevos de Encirtinos de Espana. *Bol. Soc. esp. Hist. nat.* **18** : 234–241. (*Pholidoceras.*)

——, 1921, *Himenópteros, Fam. Encírtidos.* Madrid Inst. Nac. Cienc., 732 pp. (*Pholidoceras* p. 95, *Aphycoides* p. 231.)

——, 1922, Calcidoideos nuevos de Francia. *Bol. Soc. esp. Hist. nat.* **22** : 396–402. (*Coccidencyrtus.*)

——, 1923, Adiciones a la fauna espanola de Encirtidos. *Ibid.* **23** : 174–179. (*Aphycoides.*)

——, 1928, Nota sobre algunos Encirtidos americanos. *Eos, Madr.* **4** : 5–12. (*Xanthoencyrtus.*)

TWO NEW AFRICAN SPECIES OF *CEROPTERA* MEIGEN (DIPTERA : SPHAEROCERIDAE).

By O. W. Richards, M.A., D.Sc., F.R.E.S.

The species of *Ceroptera* are now well known to hang on to the backs of Scarabaeid beetles, in the dung-pellets of which they are presumed to lay their eggs. Duda (1925 : 132) has noted that there is a rather wide range of structure amongst the species of the genus. The first species described below is so distinct that it might well be placed in a new genus, but at the moment it is treated as only subgenerically distinct. Superficially it looks much more like a *Borborus* than like a *Limosina*. A key to *Ceroptera* has recently been published by Vanschuytbroeck (1951, *Bull. Inst. roy. Sci. nat. Belg.* **27** : 10).

Ceropterella subgen. n.

Frontal area shining and extending broadly to antennae, though with sides a little converging ; four small frontal bristles on each side ; lunula well marked, with about four small bristles on each side. Front and orbits bare except for the following bristles on each side : 6–7 minute bristles right in front, nearly at level of antennae, 3 orbitals, two anterior directed outwards, posterior stronger and directed inwards, one external vertical, one external occipital, postverticals absent or very minute. Mesoscutum shining with only three rows of sparse microchaetes between the dorsocentrals and a few scattered ones more laterally ; one strong pair of dorsocentrals in front of suture and a somewhat weaker pair just in front of the scutellum. First sector of costa with all the bristles short except for a pair at base and one bristle just before the end. Mid tibia with a dorsal bristle at four-fifths, a mid ventral and a short apico-ventral. Hind tibia with a small spur-like anterior apico-ventral bristle. Abdomen with segments 3–4 membranous except for a round spot on each side of tergite 4.

Type of the subgenus—*Ceroptera* (*Ceropterella*) *nitidosa* sp. n.

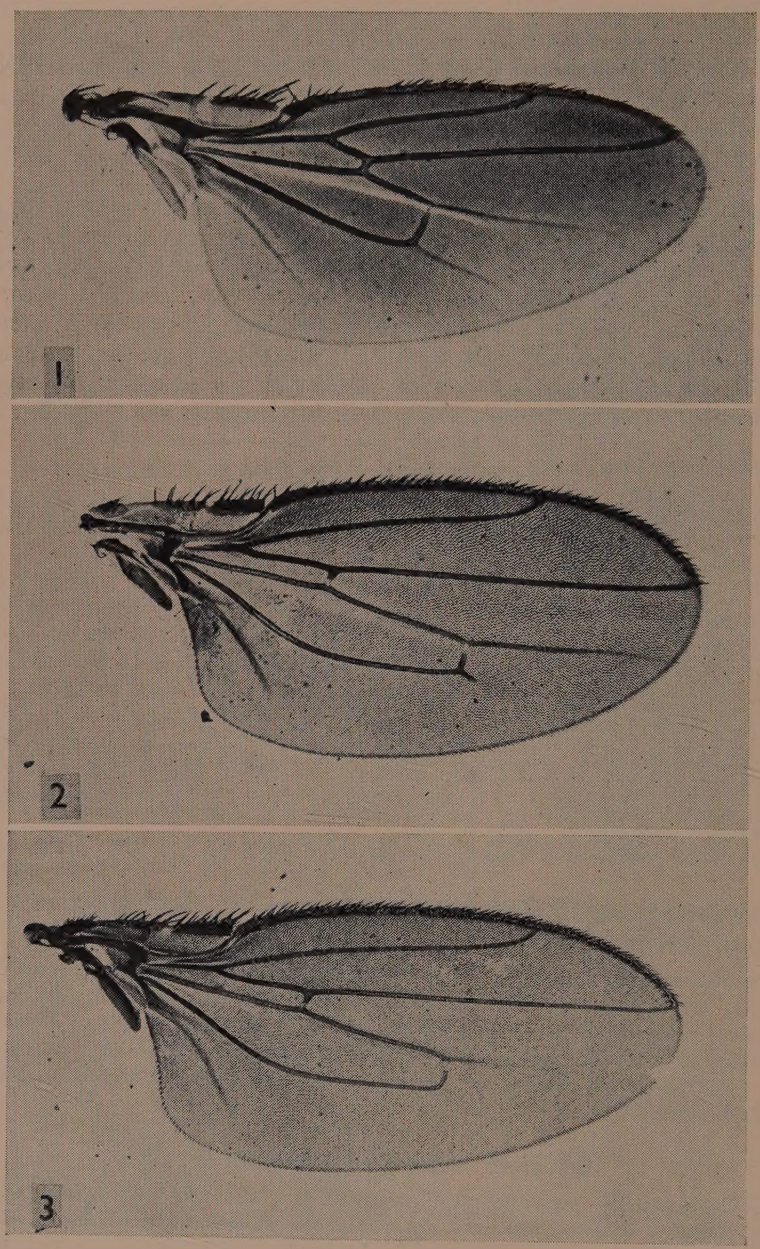
Ceroptera Meigen (*C. algira* (Villen.), *C. alluaudi* (Villen.) and *C. crispa* Duda examined) differs as follows :

Frontal area dull, with many more small bristles ; lunula smaller (except *C. crispa*) and bare ; ocellar bristles strong, internal vertical present, postvertical usually developed. Mesonotum with numerous rows of microchaetes and no anterior pair of dorsocentrals. First sector of costa with numerous long bristles, much longer than those on the second sector. Mid tibia with more numerous dorsal bristles. Abdomen normal, segments 3–4 not desclerotised.

Ceroptera (Ceropterella) nitidosa sp. n.

♂♀. Black, shining except for membranous parts of abdomen. Face, jowls and lower part of thorax somewhat piceous. Tip of femora, tibiae and tarsi brown. Halteres whitish, disk of knob darker. Wings yellowish-hyaline, with the anterior two-thirds infuscate. Length about 2·0 mm.

♀. One long vibrissa, none of other buccal bristles half so long ; third antennal segment a little angled dorsally, arista subapical, two and a half times as long as antenna, almost bare ; buccae a little higher than vertical height of eye, with a ventral marginal row of fine bristles. Mesoscutum with about twenty microchaetes in three irregular rows between



FIGS. 1–3.—Right wing of (1) *Ceroptera nitidosa* sp. n., ♂ paratype. (2) *C. catharsii* sp. n., ♀ type. (3) *C. crispa* Duda, ♂ paratype.

the dorsocentrals ; further, two or three microchaetes in same row as dorsocentrals and two or three more outside them ; one humeral, two notopleural, one presutural interalar, one supraalar, one large and one or two small sternopleurals ; two long scutellars on each side. Scutellum somewhat shorter than semicircular. Wings (fig. 1) with R5 about the same distance from the wing tip as M1 ; posterior angle of median cell emitting a pale vein which almost reaches the margin, alula small and narrow. Fore femur rather thick with a dorsal row of four short and a ventral row of 6–7 longer bristles. Mid femur with a short preapical antero-ventral bristle, hind femur with a similar longer bristle, mid tibia as already described ; mid tarsi a little longer than tibia, rather thick basitarsus with rather stout bristles beneath. Last segment of all tarsi broad, with large claws and pulvilli. Abdomen with tergites 1 + 2 subtriangular, about as long as scutellum, bare. Tergites 3–4 membranous with short bristles towards the sides ; tergite 4 with a round lateral sclerotised spot bearing a long bristle ; tergite 5 considerably narrower, as long as 1 + 2 ; bearing four long and numerous short bristles ; tergite 6 visible as a short ring-like plate ; cerci each with two short woolly hairs ; sternites 1–4 membranous with short bristles ; sternite 5 cordiform with short bristles and longer ones along its margin ; sternite 6 quadrate or just transverse with similar bristles.

♂. Similar but tergite 5 a little asymmetrical ; genitalia of moderate size, with two long bristles on the right and two shorter ventral ones ; sternite 4 small, trapeziform ; sternite 5 large, shining, a little transverse, centre of posterior margin a little reflexed with very short black pubescence.

MOZAMBIQUE : Maputo, 26.iv.1951, on the back of the Scarabaeid beetle, *Pachylomera femoralis* Kirby (*F. Zumpt*), type ♀, allotype ♂, 4 ♂ paratypes. Further, 4♂ 2♀ in bad condition also examined. The material, which will be deposited in the British Museum, was received from the Commonwealth Institute of Entomology through Dr. F. van Emden, who kindly arranged to have the wing photographed.

Ceroptera (Ceroptera) catharsii sp. n.

♀. Pale reddish brown ; eyes black ; mesopleuron a little darker ; wings moderately but evenly infuscate. Length 2·0 mm. Epistoma upturned ; face strongly carinate and prominent in side view ; antennae divergent, arista rather less than 3 times as long as antenna, pale grey, with rather long pubescence ; one strong vibrissa ; dorsum of head between eyes as long as broad ; lunula moderately distinct with two small bristles ; on each side two rather weak outwardly directed orbitals and a stronger posterior inwardly directed one, one external vertical, one external occipital ; numerous small bristles behind the ocelli, one ocellar ; about 14 minute frontals arranged in two irregular rows ; numerous minute bristles on anterior orbits. Mesoscutum with a weak dorsocentral near scutellum and a still weaker one just behind the suture, acrostichals irregularly arranged, about 12 between the anterior dorsocentrals, one strong humeral ; scutellum rather shorter than semicircular, with four bristles, the anterior pair the shorter. Legs with rather dense and conspicuous minute bristles as well as the longer ones ; mid tibia with about 5 bristles (1 + 2 pairs) on proximal half, a row of three (the middle one shorter) at four-fifths and an anterodorsal one a little above these, a mid ventral, and a short apico-ventral ; mid basitarsus long but without strong bristles ; hind tibia with one short dorsal at four-fifths, and an anteroventral at centre, apical anteroventral very small ; second tarsal segment about one and a half times as long as first ; last segment of tarsi little widened, pulvilli large. Wings (fig. 2) with fine costal bristles numerous but not very conspicuous ; second costal sector nearly twice as long as third ; R2 + 3 gently bent on to costa, R4 + 5 almost straight and ending just in front of wing tip, M1 + 2 produced as a fold to margin, cell long and narrow. Abdomen hardly as long as thorax ; tergites with very short bristles, even those at sides shorter than the length of a tergite, postabdomen in this specimen exserted, ending in two cerci each bearing 4 fine straight bristles.

Type ♀, Nigeria : Umudike, 5.viii.1950, on *Catharsius* sp. (*J. L. Gregory*). Type in British Museum (Natural History).

This species falls near *C. nasuta* (Villen.) and *C. crispa* Duda. The former has three pairs of dorsocentrals and apparently longer costal hairs. The latter (paratype, Mlanje, examined) has much longer hairs on the inside of the mid tibia and denser short black spines beneath the mid basitarsus. Both have about four fine very long bristles along the hind tibia. *C. setigera* Vanschuytbroeck seems to have denser costal hairs, the mid tibia has long fine hairs and the hind tibia has four long bristles. *C. ghesquièrei* Vanschuytbroeck has only one pair of dorsocentrals ; the abdomen has much longer bristles, and the hind tibia has a long dorsal preapical. *C. calensis* Vanschuytbroeck has one pair of dorsocentrals, the abdomen has long lateral setae, and the mid tibia has two long lateral preapical bristles.

Book Notices.

Nature Interlude. A Book of Natural History Quotations. Compiled by E. F. Linssen. 8vo. London (Williams & Norgate), 1951. Pp. 256. Price 12*s.* 6*d.*

A volume of quotations in English, both prose and poetry, on all aspects of Nature and Natural History, the first book of Natural History quotations to be published. A Foreword by Brian Vesey-Fitzgerald remarks that " The age of quotations is long since passed, and it might be thought, therefore, that there is now no need for a book such as this." But he argues that the quotations included may impel the reader to seek out the new worlds in literature and natural history which they disclose.

Name this Insect. By Eric F. Daglish. Sm. 8vo. London (J. M. Dent & Sons), 1952. Pp. xxvii + 294, 54 pls. (16 col.), text illust. Price 15*s.*

This is a companion volume to the same author's *Name this Bird.* The volume comprises very general simple keys for the identification of the more common insects, grouped into sections as follow : 1. Butterflies, 2. Moths, 3. Beetles, 4. Bugs, Plant-lice and their allies, 5. Earwigs, 6. Crickets and Grasshoppers, 7. Cockroaches, 8. Bees, Wasps, etc., 9. Dragonflies, 10. Mayflies, etc., 11. Two-winged flies, 12. Wingless insects, with a very short introductory key for the " running down " of an insect to whichever of these groups is appropriate.

NOTE ON *FORMICOMUS RUFESCENS* PÉR. (COLEOPTERA: ANTHICIDAE) AND REVISION OF THE SPECIES OF *FORMICOMUS* WITH RED PROTHORAX IN SOUTH AFRICA.

By J. C. van Hille, Ph.D., F.R.E.S.

(*Department of Entomology, Rhodes University, Grahamstown, South Africa.*)

The description of *Formicomus rufescens* Péringuey (1885) is based on three male specimens which are exceptional in this genus because of their pale reddish-brown colour. The species is not mentioned in later literature, nor have any more specimens been attributed to it.

Through the kindness of Dr. A. J. Hesse the author was allowed to examine the two specimens of the type material which are in the South African Museum in Cape Town.

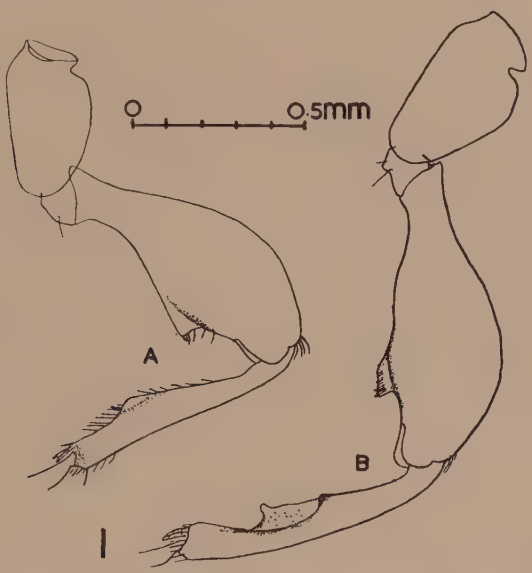


Fig. 1.—(A) Front leg of ♂ *Formicomus rubricollis* Laf. (B) Same of *F. tuberculifer* Pic.

The type specimen, which has a locality label, "Natal Maritz," and the name label, both in Péringuey's handwriting, is *Formicomus rubricollis* Laf. (de la Ferté Sénectère, 1848). The other specimen with a single label, "Natal," is what is generally known as *Formicomus tuberculifer* Pic, 1897. Both specimens are of a similar and unusual regressive colour.

Péringuey seems to have used the first specimen for the description: " . . . the prothorax is . . . very convex and rounded anteriorly, very much narrowed near the base. . . . " This applies to both species; " . . . has a deep hollow impression on either side of the posterior part of the outer margin."

This applies to *F. rubricollis*, where there is a pair of typical lateral ridges (here called margins) on the posterior part of the prothorax ; these are absent in *F. tuberculifer*. "The elytra . . . have a deep transversal impression behind the shoulders." This transverse impression is discernible in *F. rubricollis*, though it can hardly be called "deep" ; in *F. tuberculifer* it is, as a rule, and also in Péringuey's specimen, invisible. "The anterior tibiae are strongly toothed underneath . . . *F. rubricollis*, to which the *rufescens* is closely allied, in my collection have the same tooth although not quite so developed." This tooth (which is, however, on the femur, and only in the male) is triangular in *F. rubricollis* (fig. 1A), and in the author's opinion not different from Péringuey's specimen. In *F. tuberculifer* the tooth is rather different (fig. 1B), being obliquely truncate. On the front tibia the male of *F. rubricollis* has a small tubercle on the distal half ; in the male *F. tuberculifer* the distal half of the front tibia is excavated ; the inner margin of the excavation carries a small proximal tubercle, and the outer margin a larger distal tubercle. The pointed trochanter in the front leg of *F. tuberculifer* is also a male characteristic.

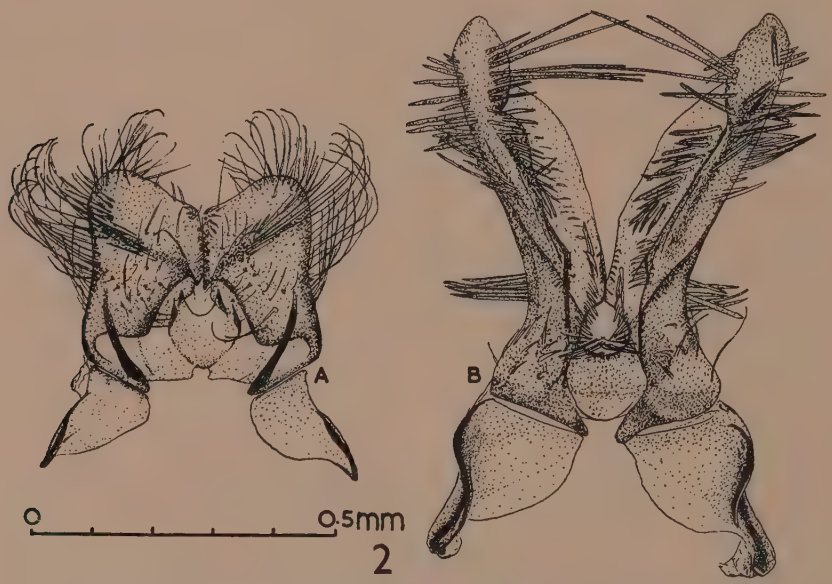


FIG. 2.—(A) Retractile sternite of ♂ *Formicomus rubricollis* Laf. (B) Same of *F. tuberculifer* Pic.

The specimens of Péringuey only differ in colour from normal specimens.

F. rubricollis does not vary in colour ; all specimens seen by the author have head, abdomen and appendages black, prothorax red, and elytra with a metallic blue reflection.

F. tuberculifer is variable in colour ; the typical colour is similar to *F. rubricollis* with the metallic reflection on the elytra less pronounced, and proximal parts of the appendages often testaceous to a variable extent. The prothorax in some specimens is lighter, yellowish, but this may darken to brown and to almost black (specimens in the author's collection from Ungurai Moun-

tains, 2500 ft., Turiani, Tanganyika, ix.1948 (*Jackson*); and from Kabete, 5800 ft., Kenya, xii.1938 (*MacInnes*)). The metallic reflection may disappear completely; the specimens are then more or less uniformly black to dark brown (specimens from Naivasha, Kenya, vii.1937 (*H. J. A. Turner*)). Regression of colour results in specimens of a chestnut-brown colour, e.g., specimens from Mt. Kenya, inferior zone, 1800 m., i and ii.1912 (*Alluaud* and *Jeannel*). These specimens are named *F. gestroi* by Pic. Similar coloured specimens from Bushanyi, Uganda, on coffee, iii.1939 (*T. H. C. Taylor*), were named *F. ganglbaueri* Pic by R. F. Heberdey. In the appendages of these paler specimens the loss of colour proceeds from proximal to distal. As a rule this takes place gradually, but a specimen from Blantyre, Nyasaland, iii.1948 (*E. T. M. Reid*), has testaceous antennae with the last three segments black.

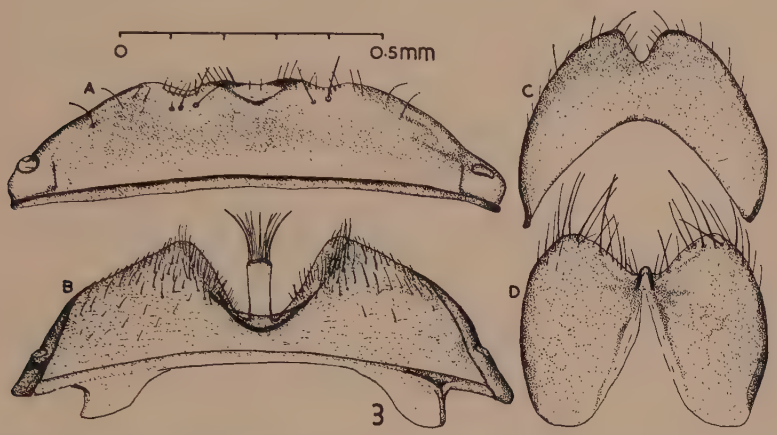


FIG. 3.—(A) Last visible sternite of ♂ *Formicomus rubricollis* Laf. (B) Same of *F. tuberculifer* Pic. (C) Retractile tergite of *F. rubricollis* Laf. (D) Same of *F. tuberculifer* Pic.

No other specimens of the same pale colour as the Péringuey specimen have been seen. The fact that his specimen of *F. rubricollis* is of a similar pale colour suggests that these specimens were exposed to abnormal conditions, which had a bleaching effect. It is not possible to decide whether this was due to exposure to light after collecting, or perhaps action of a chemical present in the collecting tube, or whether conditions in a natural habitat may produce pale forms of different species.

The following species are suspected by the author to be synonymous with *F. tuberculifer*, but as no type-specimens have been seen a final decision is impossible at the moment. In spite of the striking differences in colour, it seems impractical to subdivide the species into colour-varieties because the different colorations intergrade.

1. *F. gestroi* Pic, 1894. The specimens, identified by Pic which the author has seen, are colour varieties of *F. tuberculifer*. Apart from this there is nothing in the description of *F. gestroi* which does not apply to *F. tuberculifer* except, perhaps, the remark (after the description) that this species comes in the subgenus *Anthelephilus*, which is characterised by the total absence of humeral angles. In the description, however, the shoulders of *F. gestroi* are called " peu

anguleuses," so the significance of the remark is not clear. In *F. tuberculifer* the shoulders are slightly angular but always visible, though also here some variability occurs ; in the specimens of regressive colour, which are often also smaller than the typical ones, the shoulders may be less pronounced.

2. *F. bituberculatus* Pic, 1897*a*. *F. tuberculifer* is described as a possible colour variety of this species. In *F. bituberculatus* the prothorax is dark. *F. bituberculatus* var. *maynei* Pic, 1913, from Belgian Congo, is described as a variety with a lighter prothorax and denser punctuation on the head ; the type material of this variety in the Congo Museum, Tervuren, Belgium, is identical with *F. tuberculifer*.

3. *F. ganglbaueri* Pic, 1900, from Tanganyika is a dark form described as close to *F. bituberculatus*, but with a less shiny head. The description gives a good account of the secondary sex-characteristics on the male front leg. Specimens seen from Uganda, named by R. F. Heberdey, are a dark form of *F. tuberculifer*. The type of *F. ganglbaueri* is in the Museum in Vienna. This is probably the explanation of the fact that Heberdey, working in Graz, should have used this name instead of either *F. bituberculatus* or *F. tuberculifer*, which are more commonly used in the French literature.

4. *F. obconiceps* Pic, 1917, from Portuguese East Africa is described as near *F. tuberculifer* with some differences. A single specimen seen in the Museum in Paris, which is a paratype, if it is not the type, did not show any features falling outside the range of variability of *F. tuberculifer*.

In the genus *Formicomus* the best specific characteristics are the last visible sternite, and the retractile sternite and tergite, all of the male. These parts, not previously figured, are shown in figs. 2 and 3. The retractile sternite in *F. rubricollis* (2A) with the folded-in lateral lobes and in *F. tuberculifer* (2B) with the enormous inwards pointing bristles are especially characteristic, and different from those of all similar looking species. The retractile tergite of *F. rubricollis* (3C) is incompletely divided in two, but in *F. tuberculifer* (3D) the two halves of the retractile tergite are only attached at the distal tip. The last visible sternite of *F. rubricollis* (3A) has a slight notch in the middle, and shows little marked scallops at the posterior margin, but in *F. tuberculifer* (3B) the posterior margin is deeply hollowed out and carries, in the middle, a rectangular tubercle with a row of stiff terminal hairs.

A third and undescribed species of *Formicomus* of similar colouring which occurs in South Africa[1] is described below.

Formicomus omeri sp. n.

Head black, dull, broadly rounded behind ; closely punctured ; with short black hairs. *Prothorax* brownish-red to yellow, dull, rounded in front, narrowing backwards, with shallow lateral posterior impressions, without ridges or tubercles ; closely punctured ; with short grey hairs. *Abdomen* black or dark brown, the first sternite often lighter in colour ; with fine white recumbent hairs. Elytra with blue metallic reflection, rather dull, less convex than in the previous species, with sloping but angular shoulders, closely and sometimes very finely punctured ; with rather close white recumbent hairs. *Antennae* and *legs* black, or the proximal parts testaceous in paler specimens. Spine on male first leg (fig. 4D) with convex proximal curve and concave distal curve ; tibia of first leg of male scalloped

[1] *Formicomus lesnei* Pic, 1932, described from Portuguese East Africa and also found in Nyasaland, has not been collected in South Africa. Though similar to *F. rubricollis* it is clearly a different species.

out over distal third of inner margin. Last visible sternite in male (fig. 4c) shallowly excavated over distal margin, and with a median rounded tubercle with stiff erect hairs. Retractile sternite of male (fig. 4b) not strongly chitinized ; with three pairs of lobes : the outer lobes short and thin, the middle lobes more than twice as long as the outer ones, somewhat spoon shaped, with a tuft of incurving hairs at the tip ; the inner lobes longer

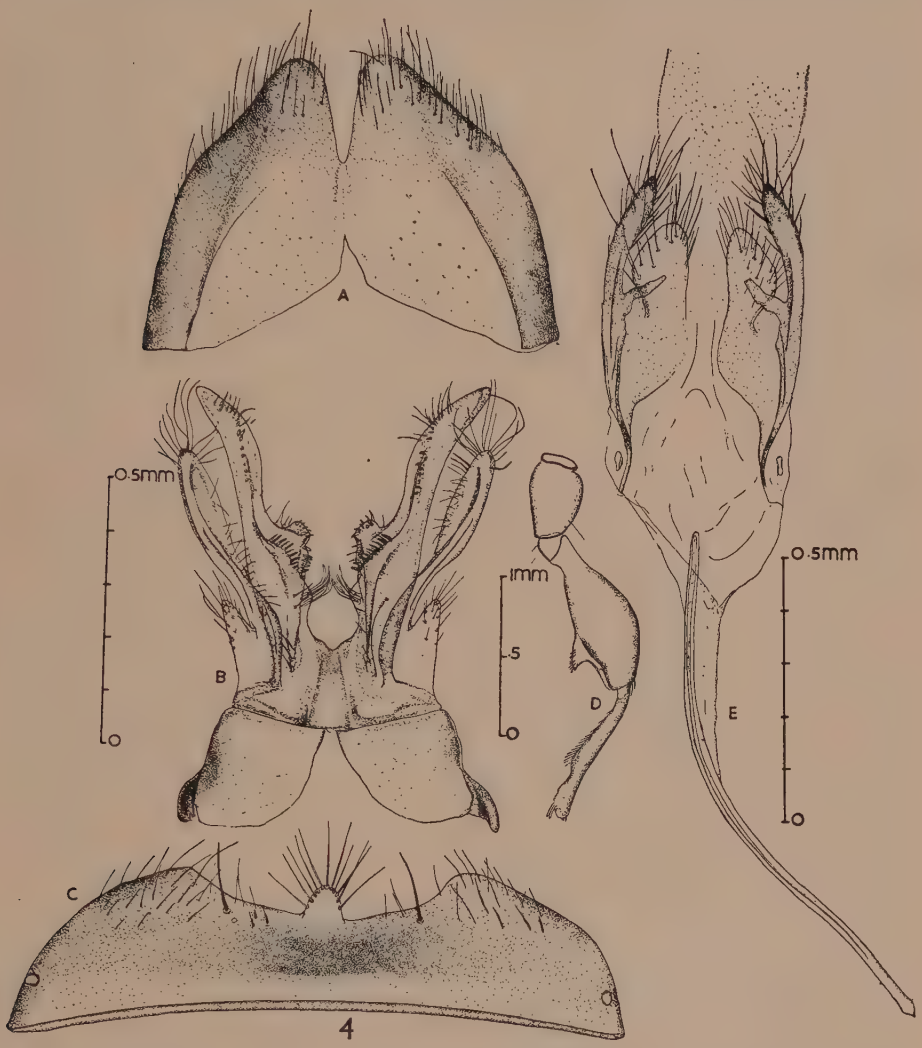


Fig. 4.—*Formicomus omeri* sp. n. (a–d) ♂ : (a) retractile tergite, (b) retractile sternite, (c) last visible sternite, (d) front leg. (d at smaller scale). (e) ♀ : retractile segment and spiculum.

than the middle ones, slightly pointed, each with a median, bluntly rectangular tubercle pointing inwards at about half length, and under this a number of inwards and upwards pointing hairs. Retractile tergite of male (fig. 4a) strongly bilobed ; the median line of attachment is about half the total length of the lobes and very delicate. Spiculum of male slender and forked distally.

Retractile segment of female (fig. 4E) better developed than in the previous species; tergite and sternite both completely divided in two lobes, which are attached to each other with the membrane, which is continuous with the genital tube; laterally the tergal and sternal lobes articulate with each other; tergal lobes long and slender with weakly chitinized inward-pointing transverse process; sternal lobes broader and less chitinized than tergal lobes; spiculum of female simple, not forked distally.

Length: 4·8–3·9 mm., average 4·4 mm. Greatest breadth over elytra 1·5–1·1 mm., average 1·3 mm.

Holotype, ♂, ZULULAND Mkuzi, "taken by sweeping," 16.i.48 (*J. Omer-Cooper*).

Paratypes, 8 ♂, 18 ♀, same particulars as holotype; 2 ♂, 1 ♀, S.W. AFRICA: Oshikango, N. Ovamboland (*C. Koch*).

It is remarkable that this species was not present among the vast Anthicid material collected by light-trap in the Mkuzi Valley during the investigations of the insect fauna in connection with the DDT spraying experiments against Tsetse flies by the Division of Entomology. A few specimens were collected on sheets after the DDT spraying from aeroplanes. The species is apparently diurnal and climbs up bushes. The wings are well developed, but probably not used, as is also the case in other species of *Formicomus*.

SUMMARY.

Reasons are given for sinking the species *Formicomus rufescens* Pér. Characteristic features are given of the South African species of *Formicomus* with red prothorax, and a new species is described; a number of other species, possibly synonyms, described from other parts of Africa are briefly discussed.

ACKNOWLEDGMENTS.

The author has to thank the authorities of the South African Museum, Cape Town, for the loan of material; the authorities of the British Museum, London, the National Museum of Natural History, Paris, and the Museum of the Belgian Congo, Tervuren, for hospitality and assistance; Professor J. Omer-Cooper, Rhodes University, Grahamstown, for his interest and encouragement, and him and many others for collecting and supplying material.

REFERENCES.

FERTÉ-SÉNECTÈRE, M. F. DE LA, 1848, *Monographie des* Anthicus *et genres voisins. Coléoptères hétéromères de la Tribu des Trachélides, Paris* **1–22**: 1–340, pls. 17–32.

PÉRINGUEY, M., 1885, First contribution to the South African coleopterous Fauna. *Trans. S. Afr. philos. Soc.* **3**: 74–150, plates.

PIC, M., 1894, Nouvelles espèces d'Anthicides appartenant au Musée civique de Gènes. *Ann. Mus. Stor. nat. Genova* (2) **14**: 582–587.

——, 1897*a*, Déscriptions de Coléoptères exotiques. *Naturaliste* **19**: 25.

——, 1897*b*, Anthicides exotiques nouveaux. *Ibid.* **19**: 134.

——, 1900, Diagnoses de divers "Anthicidae" et d'un Entypodera de l'Afrique orientale. *Échange* **16**: 34–36.

——, 1913, Coléoptères malacodermes et hétéromères du Congo belge. *Rev. zool. afr.* **3**: 156–165.

——, 1917, Nouveaux Coléoptères exotiques. *Bull. Mus. Hist. nat., Paris* **23**: 258–263.

——, 1932, Contributions à l'étude de la faune du Mozambique. Voyage de M. P. Lesne (1928–1929). *Mem. Mus. zool. Univ. Coimbra* (1) **60**: 1–26.

PRELIMINARY NOTES ON AFRICAN TIPHIIDAE (HYMENOPTERA).

By C. Jacot Guillarmod, F.R.E.S.

The following short notes on synonymy in this group have been made during the study of various specimens lent to the author: when the full revision of members of this group from the Ethiopian region is completed due acknowledgment for these loans and for help given will be made, but meanwhile the following notes may be of use to other workers in this field.

Subfamily Myzininae.

Braunsomeria Turner.

1912, *Braunsomeria* Turner, *Proc. zool. Soc. Lond.* **1912**: 697. Type: *Braunsomeria quadraticeps* Turner.
1913, *Bruesia* Kieffer, *Boll. Lab. Zool. Portici* **7**: 325. **Syn. n.** Type *Bruesia adjacens* Kieffer.
1914, *Bruesiola* Kieffer, *Das Tierreich* **41**: 238. **Syn. n.** Type *Bruesia adjacens* Kieffer.

The above synonymy is based on specimens found in the South African Museum, Cape Town; these, though not so marked, cannot be anything else but Kieffer's types. *Bruesia*, placed by Kieffer in the Serphidae, was subsequently renamed by him *Bruesiola*, the previous name being pre-occupied. *Bruesiola* was placed in the Bethylidae. There is no doubt, however, that this genus belongs to the subfamily Myzininae of the Tiphiidae.

Braunsomeria quadraticeps Turner.

1912, *Braunsomeria quadraticeps* Turner, *Proc. zool. Soc. Lond.* **1912**: 698. ♂ and ♀.
1913, *Bruesia adjacens* Kieffer, *Boll. Lab. Zool. Portici* **7**: 326. ♀, **Syn. n.**
1913, *Bruesia dubia* Kieffer, *Boll. Lab. Zool. Portici* **7**: 326. ♀. **Syn. n.**
1914, *B*[*ruesiola*] *adjacens* Kieffer, *Das Tierreich* **41**: 239. ♀.
1914, *B*[*ruesiola*] *dubia* Kieffer, *Das Tierreich* **41**: 239, 240. ♀.

The type of *Braunsomeria quadraticeps* from Willowmore, Cape Province, has not been seen, but the identification is based on five specimens examined, all from the type locality.

There is more doubt about Kieffer's types. Among the material sent by the South African Museum there were two specimens (one dealt with under *atriceps*) with the following data: "Prieska, 10.'87"; below this there is another label on which is written "*Bruesia adjacens* K," in what I believe to be Kieffer's handwriting (it is certainly not Péringuey's writing); below this again is another label in R.E. Turner's writing, with "*Braunsomeria quadraticeps* Turn. Fam. Scoliidae" on it. To this I have added a red label with "Holotype *Bruesia adjacens* Kieffer *teste* 1947 C. J. Guillarmod." When I received this specimen I wrote to Dr. Hesse of the South African Museum, asking him to look through the collections there, especially among the Bethylidae, to see if he could find any specimens marked "Type" and also to see if there were any specimens of *Bruesia dubia* Kieffer. Among the Bethylidae he found two specimens, one which will be dealt with later under the next species discussed, and one headless

female with no determination label but with a locality label as follows : "Hanover C. G. Crown Schr. 1902." To this specimen I have attached a red label with " Holotype *Bruesia dubia* Kieffer *teste* 1947 C. J. Guillarmod." As the locality labels do not agree with those given by Kieffer, it would appear presumptuous to label the above specimens as I have done, without the explanation I give below.

In 1913 and 1914 Kieffer gave Natal : Hanover, as the locality for *adjacens* ; in 1913, for *dubia* he gave no locality, while in 1914 he gave Kapland. The obvious would have been to treat the specimens in the reverse way to that which I have given, but my reasons for not doing so are these (1) the Prieska specimen is labelled *adjacens*, and (2) (to my mind the more important) the specimen from Hanover is headless, which Kieffer mentions under *dubia* at the end of the description in *Das Tierreich*. The labels were either transposed on the specimens or Kieffer transposed them in his descriptions. It may be added here, to correct a mistake made by Kieffer, that Hanover is in the Cape Province, there being no Hanover in Natal, but a New Hanover. Kieffer's two types are in poor condition, and it is difficult to make out whether they are the same species. Before long series of good specimens have been obtained from the type localities, it is impossible to say whether they are *quadraticeps*, but if not, then they are either subspecies or very closely allied forms.

Braunsomeria atriceps Turner.

1912, *Braunsomeria atriceps* Turner, *Proc. zool. Soc. Lond.* **1912** : 699. ♀.
1913, *Bruesia distans* Kieffer, *Boll. Lab. zool. Portici* **7** : 326. ♀. **Syn. n.**
1914, *B[ruesiola] distans* Kieffer, *Das Tierreich* **41** : 240. ♀.

Type locality, Algoa Bay.

To add further to the argument brought out under the previous species as to the authenticity of Kieffer's types, I have received two specimens named as *Bruesia distans* Kieffer, from the South African Museum. One has the three following labels : " Algoa Bay Capland Dr. Brauns " "*Bruesia distans* K." (in the same writing as the previous species), "*Braunsomeria atriceps* Turn." (in R. E. Turner's writing). I have added a fourth red label " Lectotype *Bruesia distans* Kieffer *teste* 1947 C. J. Guillarmod." The other specimen has only two labels : " Constantia Purcell '01," "*Holepyris* (1) *natalensis* K. 2 (aptère) *Bruesia distans* K." I have added a third green label reading : " paratype *Bruesia distans* Kieffer *teste* 1947 C. J. Guillarmod." The lectotype locality has been chosen as Algoa Bay because it is the first locality mentioned in Kieffer's description. The two names on the second specimen are somewhat puzzling, but it would appear that the numbers in brackets refer to specimens which were on one pin and one of these has been removed, the name remaining behind. There is no doubt that the lectotype is the same species as *atriceps* Turner, as they were both collected from Algoa Bay by Dr. Brauns. The specimen from Constantia appears to be the same but is in rather poor condition.

Meria Illiger.

1807, *Meria* Illiger, *Mag. Insektenk.* (Illiger) **6** : 194.
Myzine Turner *nec* Latreille.

Type *Tiphia tripunctata* Rossi.

Meria is the name that should be used for all African species placed in the genus *Myzine* (= *Myzinum*) by recent authors. *Myzinum* is restricted to the New World.

Meria perornata (Turner), **comb. nov.**

1908, *Myzine* (*Pseudomeria*) *perornata* Turner, *Ann. Mag. nat. Hist.* (8) **1** : 499. ♀.
1910, *Plesia pacificatrix* Cameron, *Ann. Transv. Mus.* **2** (3) : 118. ♂. **Syn. n.**

Turner has suggested that Cameron's species is probably the male of *perornata*, and it has been my good fortune to collect this insect at Mamathes, Basutoland, under circumstances which leave no doubt that they are both sexes of one species. This distinct species is not happily placed in *Meria*, but before transferring it to a new genus I wish to be more familiar with some North African genera, as I have a male from that region which is extremely close to that of *perornata*.

Meria infradentata (Turner) **comb. nov.**

1913, *Myzine infradentata* Turner, *Trans. ent. Soc. Lond.* **1912** : 728. ♀.
1925, *Pseudomeria mitida* Berland, *Miss. Rohan-Chabot* **4** (3) : 148. ♀. **Syn. n.**

This species probably belongs to the subgenus *Macromeria*. It is not closely allied to *Pseudomeria*.

Mesa Saussure.

1892, *Mesa* Saussure, *in* Grandidier, *Hist. Madag.* **20** (1) fasc. 2 : 243.

Type *Mesa heterogamia* Saussure.

The African species placed in the genera *Elis* and *Plesia* have to come in this genus, the above genera being synonyms of *Myzinum*.

Mesa capensis (Lepeletier) **comb. nov.**

1845, *Tiphia capensis* Lepeletier, *Hist. nat. Ins. Hymén.* **3** : 554. ♀.
1892, *Mesa peringueyi* Saussure, *in* Grandidier, *Hist. Madag.* **20** (1) : 245. ♀.
1908, *Plesia* (*Mesa*) *capensis* Turner, *Ann. Mag. nat. Hist.* (8) **1** : 506. ♀.
1910, *Myzine nigrita* Turner, *Trans. ent. Soc. Lond.* **1910** : 391. ♂. **Syn. n.**
1913, *Myzine klugii* (West.) Turner, *Trans. ent. Soc. Lond.* **1912** : 729 (♂ only).
1916, *Myzine klugi* (West.) Turner, *Ann. S. Afr. Mus.* **15** : 459 (♂ only).

Only the relevant references have been given here. From Lepeletier's figure it is obvious from the venation that his species cannot be placed in the genus *Tiphia*, as was repeatedly pointed out by Turner. In spite of this, catalogues still quote this species under *Tiphia*. I have followed Turner in the interpretation of this species although it is not certain whether the species as here understood is actually the same as Lepeletier's, but, of all the species known to me, it is the one that comes nearest to Lepeletier's description and figure. There is a variation in the colour of the hairs on the thorax from black, through rufous to grey, and when more specimens from various localities are known it will probably be found that the species can be divided into subspecies ; in that case de Saussure's name will be available in a subspecific sense. With regard to the male, Turner was apparently misled by Brauns in considering his *Myzine nigrita* as the male of *Meria klugii*. The male of that species is quite different and has nothing to do with *nigrita*. I am putting *nigrita* into synonymy on geographical

distribution but there is no definite proof that the synonymy is correct. I have seen the male specimen from Zululand which Turner determined as *Myzine klugii* Westwood. There is no doubt that it belongs to *Mesa capensis* as here understood and, as this species is so far known only from the western portion of the Cape Province, there may have been an error in labelling.

Mesa capitata (Smith) **comb. nov.**

1855, *Myzine capitata* Smith, *Cat. Hymen. Ins. Brit. Mus* **3** : 74. ♂.
1892, *Myzine clavata* Saussure, *in* Grandidier, *Hist. Madag.* **20** (1) : 242. ♂. **Syn. n.**
1912, *Elis* (*Mesa*) *auriflua* Turner, *Proc. zool. Soc. Lond.* **1912** : 705. ♀.

At various times Turner has referred to this species (the references not being given above). From the specimens I have seen from the British Museum it is obvious that he had not separated the males of his two species *adelogamia* and *auriflua* ; thus he first gave *auriflua* as a synonym of *capitata*, and a few years later he said that the true female of *capitata* was his *adelogamia*. His first opinion was correct, as is shown from numerous specimens of both species collected at Mamathes, Basutoland, among which is a pair *in copula*. From notes on the type of *capitata* kindly supplied to me by Mr. Benson of the British Museum I was able to confirm which species was *capitata* (Smith). Dr. Ferrière of Geneva was kind enough to compare specimens sent to him with de Saussure's type of *clavata* and it is certain that it is the same as Smith's species.

Mesa adelogamia (Turner) **comb. nov.**

1908, *Plesia* (*Mesa*) *adelogamia* Turner, *Ann. Mag. nat. Hist.* (8) **1** : 503.

This is a good species and not a synonym of *capitata*, as has already been pointed out under *capitata*. It is a common species, which, as will be shown in a forthcoming paper, breaks up into three distinct subspecies.

Mesa angolensis Berland.

1925, *Mesa angolensis* Berland, *Miss. Rohan-Chabot* **4** (3) : 150. ♀.
1926, *Elis* (*Mesa*) *euryclea* Turner, *Ann. Mag. nat. Hist.* (9) **17** : 106. ♀. **Syn. n.**

This species may eventually have to be named *diversicornis* (Turner), as that species is most probably the male of *angolensis*.

Subfamily Tiphiinae.

Tiphia transvaalensis Cameron.

1857, *Tiphia pedestris* Gerstäcker, *Monatsber. Ak. Berlin*, **1857** : 512. ♀. **Syn. n.**
1862, *Tiphia pedestris* Gerstäcker, Peter's *Reise Mossamb.* (*Zool.*) **5** : 492. ♀.
1897, *Tiphia pedestris* Dalla Torre, *Cat. Hymen.* **8** : 140. ♀.
1910, *Tiphia transvaalensis* Cameron, *Ann. Transv. Mus.* **2** : 116. ♀.
1910, *Tiphia pedestris* Turner, *Trans. ent. Soc. Lond.*, **1910** : 396. ♀.
1936, *Tiphia pedestris* Hedicke, *Hym. Cat., Tiphiidae* **1** : 20.
1936, *Tiphia transvaalensis* Hedicke, *Hym. Cat., Tiphiidae*, **1** : 25.
1938, *Tiphia turneri* Krombein, *Ent. News* **49** : 187. **Syn. n.**
1939, *Tiphia pedestris* Arnold, *Occ. Pap. nat. Mus. S. Rhod.* **8** : 39. ♀. (Not *Tiphia pedestris* Fabr. which is a Thynnid.)

The above synonymy is based on Cameron's type in the Transvaal Museum, Pretoria, and specimens determined as *Tiphia pedestris* Gerstäcker in the British Museum.

RECORDS OF *CULEX* SPECIES (DIPTERA : CULICIDAE) FROM WEST NILE DISTRICT, UGANDA, WITH NOTES ON THEIR BEHAVIOUR.

By W. H. R. Lumsden, Ch.B., F.R.E.S., and Mrs. E. C. C. van Someren.

Introduction.

An investigation of the epidemiology of yellow fever was carried out in West Nile District, Uganda, from 6th March to 3rd April, 1950, and the main results of that work have already been reported (Lumsden and Buxton, 1951). Most of the species of *Culex* were considered to have little or no importance in the transmission of yellow fever virus and were there recorded mainly as *Culex* spp. indet. However, the adult specimens obtained have now been identified by one of us (E. C. C. van S.), and it would appear to be of value to record the species encountered together with brief notes on their behaviour and occurrence. Descriptions of the areas studied and of the work carried out are available in Lumsden and Buxton (*loc. cit.*) and will not be repeated here. Two points may, however, be mentioned for clarity's sake :

The term " baited catch " refers to a catch carried out by native boys in which the insects settling on their skin are captured. The occurrence of a given mosquito in such a catch is not proof that the species bites man, but is strongly indicative of this habit. However, males are taken occasionally by this method. References to the time of occurrence of mosquitoes in baited catches are related to a 24-hour clock scale (" catch time ") on which 06 and 18 hours correspond approximately to sunrise and sunset respectively.

The nomenclature used follows Edwards (1941).

Records and Notes.

Culex (*Lutzia*) *tigripes* de Grandpré et de Charmoy.

Koboko ; Godia.

Breeding in stagnant, heavily-shaded, relict pool in stream bed. Larvae, 19 ; ♂, 1. These larvae, obligatory predators, were associated with larvae of *C.* (*N.*) *salisburiensis* Theobald and *C.* (*C.*) *univittatus* Theobald.

C. (*Neoculex*) *salisburiensis* Theobald.

Koboko ; Godia.

Breeding in stagnant, heavily-shaded, relict pool in stream bed. Larvae, 17 ; ♂, 3.

In baited catch in riverain forest ; ground level, 05–07 hours. ♀, 2.

C. (*N.*) *horridus* Edwards.

Koboko ; Godia.

Breeding in hole in tree, *Bridelia ferruginea* Bentham. Larvae, 2. *C.* (*Mochthogenes*) *inconspicuosus* Theobald or *fimbriforceps* Edwards.

West Madi ; River Nyawa.

Breeding in unshaded, relict pools in stream bed. Larvae, 6.

C. (*Culex*) *poicilipes* Theobald.

Koboko ; Godia and Midia. Aringa ; Rivers Kenya and Koich. West Madi ; River Nyawa.

Breeding in shaded, stagnant relict pools in stream beds. Larvae, 6 ; ♂, 1 ; ♀, 1.

In baited catches in riverain forest and wooded grassland. ♀, 23. All occurred at night and all except one in the trees at 6–11 m. level. More detailed discussion of its occurrence has already been given (Lumsden and Buxton, 1951).

C. (*C.*) *annulioris* Theobald.

Koboko ; Godia. Aringa ; River Koich.

Breeding, probably of this species, in a ditch fed by a spring and in shaded stagnant pools in stream beds. Larvae, 19. (Of 20 larvae taken of the *C.* (*C.*) *bitaeniorhynchus* group, 19 agreed with Hopkins's (1936) descriptions of *C.* (*C.*) *annulioris* or *aurantapex*, which he considers inseparable ; the remaining larva approached *C.* (*C.*) *bitaeniorhynchus* Giles.)

In baited catch in riverain forest ; ground level ; 18–19 hours. ♀, 3.

C. (*C.*) *univittatus* var. *neavei* Theobald.

Koboko ; Godia and Midia. Aringa ; Yumbe and the junction of Rivers Kenya and Koich ; West Madi, River Nyawa.

Breeding in relict pools in stream beds and in ditches. Larvae, 127 ; ♂, 1 ; ♀, 1.

In baited catches in forest and wooded grassland. Of the 29 *Culex* taken at levels between 6 and 11 m. in the trees, 22 were identified and 21 were *C.* (*C.*) *univittatus* var. *neavei*. Of the 9 taken at ground level 6 were identified and all were the same species. The species is thus clearly more common at the upper levels. Further, in view of the very small representation of other species among those identified it may be assumed that the remainder were also mainly *C.* (*C.*) *univittatus* var. *neavei* ; the identified specimens were well distributed (see Table below). Thus the total numbers of *Culex* taken, with the single deduction noted above, may be taken to give a curve representative of the diurnal rhythm of biting activity of *C.* (*C.*) *univittatus* var. *neavei*. The hourly arithmetic mean catch of the species, per catching team, both levels included, on this basis, together with the crude numbers, are set out below :

Hour beginning (catch time)	18	19	20	21	22	23	00	01	02	03	04	Totals.
Total *Culex* spp.	2	13	3	3	2	2	2	2	5	2	2	38
C. (*C.*) *univittatus* var. *neavei*	2	9	1	3	2	2	2	1	3	1	1	27
Mean catch of *Culex* spp. per team per hour	0·11	0·72	0·11*	0·17	0·11	0·11	0·11	0·11	0·28	0·11	0·11	

* 1 specimen of *C.* (*C.*) *decens* deducted.

Biting activity was confined to the night hours and there was a well-marked peak of biting activity between 1 and 2 hours after sunset.

C. (*C.*) *simpsoni* Theobald.

Aringa ; River Kenya.

Breeding in deep, stagnant, relict pool in stream bed. Larvae, 2. These larvae were mentioned in Lumsden and Buxton (1951) as *Culex* (*Neoculex*) *? kingianus* Edwards. They have now been compared with material in the collection in the Medical Research Laboratory, Nairobi, and are the same as larvae there, also at first considered to be of *C.* (*N.*) *kingianus*, but which, when bred out material (from Mombasa) became available, were found to be of *C.* (*C.*) *simpsoni* ; this determination was confirmed by the examination of the male hypopygium. The larvae differ from Hopkins's (1936) description of *C.* (*C.*) *simpsoni* notably as follows :

Head seta B about the length of the head, usually double ; head seta C about half the length of B, more often single ; comb of about 30 teeth of which the anterior are scales, the posterior long, rather dark, spines.

C. (*C.*) *? pipiens* Linnaeus.

Aringa ; River Kenya.

Breeding in relict pool in stream bed. Larva, 1 (3rd instar).

C. (*C.*) *chorleyi* Edwards.

Koboko ; Godia.

Breeding in ditch choked with vegetation. Larva, 1.

C. (*C.*) *musarum* Edwards.

Payida ; River Nyagak.

Breeding in axils of wild banana plants (*Musa* (*Physocaulis*) sp. indet.) in riverain forest. Larvae, 15.

C. (*C.*) *decens* Theobald.

Koboko ; Godia and Midia.

Breeding in relict pool in stream bed in riverain forest. ♂, 1.

In baited catch in riverain forest, at 11 m. level, 20–21 hours. ♀, 1.

C. (*C.*) *trifoliatus* Edwards.

Koboko ; Godia.

Breeding in shaded stagnant relict pool in stream bed in riverain forest. ♂, 1.

In baited catch in riverain forest at ground level. ♂, 2 (06–07 hours) ; ♀, ? this species, 2 (02–03 and 18–19 hours).

Discussion.

The mechanism by which yellow fever virus survives in areas where the yearly dry season is rigorous and prolonged is not yet known. Various possibilities are discussed by Lumsden and Buxton (1951), one of which is that a continuous series of cyclical episodes of transmission from monkey to monkey might be maintained by a species of mosquito which occurs as an adult throughout the dry season. In West Nile District species occurring as adults during the whole of the dry season would seem to be confined to those breeding in relict pools in otherwise dry stream-beds. Of these species suspicion would attach most to those which tend to bite at the upper levels in the trees and by night,

these characteristics indicating that their main hosts are likely to be monkeys. Attention has already been drawn to *C.* (*C.*) *poicilipes* in this connection (Lumsden and Buxton, 1951). The results now reported show that *C.* (*C.*) *univittatus* var. *neavei* behaves in the same manner; biting adult females were commoner at 6–11 m. levels than on the ground and occurred exclusively by night. A peak of biting activity occurred at 19–20 hours, at which time monkeys are generally quiescent in their sleeping trees (Lumsden, 1951).

Summary.

(1) The species of *Culex* collected in West Nile District, Uganda, in March and April, 1950, are reported, together with short notes on their behaviour.

(2) Attention is directed to *C.* (*C.*) *univittatus* var. *neavei* as possibly concerned in the maintenance of yellow fever virus among the wild monkey population of the district.

References.

Edwards, F. W., 1941, *Mosquitoes of the Ethiopian Region. III. Culicine Adults and Pupae.* London: Brit. Mus. (Nat. Hist.).

Hopkins, G. H. E., 1936, *Mosquitoes of the Ethiopian Region. I. Larval Bionomics of Mosquitoes and Taxonomy of Culicine Larvae.* London: Brit. Mus. (Nat. Hist.).

Lumsden, W. H. R., 1951, The night-resting habits of monkeys in a small area on the edge of the Semliki Forest, Uganda: a study in relation to the epidemiology of sylvan yellow fever. *J. anim. Ecol.* **20**: 11–30.

——, and Buxton, P. A., 1951, A study of the epidemiology of yellow fever in West Nile District, Uganda. *Trans. R. Soc. trop. Med. Hyg.* **45**: 53–78.

Book Notice.

The Freshwater Life of the British Isles. By John Clegg. (Wayside and Woodland Series.) Sm. 8vo. London (Frederick Warne & Co.), 1952. Pp. 350, 67 pls. (16 col.), text-illust. Price 21*s*.

This volume of the well-known Wayside and Woodland Series is one of the very few books of recent years to deal with every aspect of freshwater life.

After a chapter dealing with the chemical and physical properties and the types of habitat of freshwater, the two succeeding chapters deal in turn with plants of the waterside, and simple plants followed by the animal life in an ascending series from the Protozoa to the Vertebrata. The two final chapters deal first with the collection of specimens, second with the human aspects of freshwater biology.

SOME NEW SPECIES OF DYTISCIDAE (COLEOPTERA) FROM THE CAPE PROVINCE OF SOUTH AFRICA.

By Joyce Omer-Cooper, B.A., Ph.D., F.R.E.S.

(*The Entomological Laboratory, Rhodes University, Grahamstown, South Africa.*)

At the end of 1950 I received from Mr. A. D. Harrison, of Cape Town University, for identification, a collection of Dytiscidae taken by him in the course of the survey of the fresh waters of South Africa undertaken by that University. The collection contained several new species and this paper comprises descriptions of them, together with some hitherto undescribed species taken by my husband and myself in the course of our collecting in the same area. I should like to take this opportunity of expressing my thanks to Mr. J. Balfour-Browne of the British Museum and to Dr. Guignot of Avignon for much trouble taken on my behalf in the comparing of specimens and the provision of helpful advice, also to my husband for his helpful criticisms and encouragement and to Professor K. D. White of this University, who has assisted me with the Latin diagnoses.

Laccophilus spadix sp. n.

Regulariter ovalis, apice oblique truncatus, sat convexus, rufo-testaceus, elytrorum disco adumbrato, reticulatione duplici distincta et punctata; subtus rufo-testaceus, pedibus antennisque rufo-testaceis. 4·25–4·8 × 1·8–2·25 mm.

Rather dull, somewhat convex, regularly oval but gradually narrowing in the apical third, with apex obliquely truncate. Doubly reticulate, the larger reticulation being the more evident with very distinct punctures on the meshwork. Tibial spines bifid. *Head* reddish testaceous with antennal insertions and hind margin broadly brown, the brown extending as vague markings on the vertex. Doubly reticulate, the meshes of the large reticulation being evidently punctured, the smaller reticulation within being only visible on the hind region and side margins of eyes. Antennae reddish testaceous, vaguely marbled with brown, last joint brown. *Pronotum* reddish testaceous, with an anterior and posterior border (wider in the middle), a vague marking on disc, and a row of spots parallel with the anterior border, brown; doubly reticulate, the meshwork of the larger reticulation finely punctured, the smaller reticulation very fine; there is an irregular row of large punctures anteriorly, and some large punctures posteriorly at the sides; both male and female with longitudinal rugose striae at the sides posteriorly but not reaching the edge. Sides narrowed in front, scarcely rounded, base scarcely sinuate, with a wide shallow angle in the scutellary region. *Elytra* reddish testaceous with disc suffused with brown. Doubly reticulate, the larger meshwork being clearly punctured; with two obscure rows of serial punctures on each elytron and some larger scattered punctures at base, sides and apex; not pubescent, but with a postero-lateral row of long silky hairs. *Underside* shining, reddish testaceous, but metacoxae and hind portion of epipleurs darker; head, anterior legs and anterior portion of epipleurs testaceous; singly reticulate, the reticulation being well marked, small and longitudinal in direction on the metacoxae, which have no coxal file; impunctate except for a longitudinal double row of punctures in the middle of the metasternum, a few scattered punctures on the metacoxal processes

and the anal sternite, and punctures bearing sensory hairs in the middle line of the abdominal ventrites, which are reticulate and transversely striate; metacoxal processes truncate and notched, prosternal process very narrowly lanceolate and keeled.

♂. Anal sternite keeled, roundly pointed, posterior margin scarcely excised at the sides, punctured and transversely striate, lateral setae very short (fig. 1A). Aedeagus and parameres (fig. 1C).

♀. Anal sternite more roundly pointed, sides of posterior margin slightly sinuate, lateral setae absent (fig. 1B).

This species apparently falls into the 9th group of the table given by Guignot (1945, *Mem. Mus. Hist. nat., Paris* (N.S.), **19** : 262).

I am not familiar with either *L. inornatus* Zimm. nor *L. leonensis* Rég., but from description this species should have a superficial resemblance to both. It is, however, considerably larger than either and the larger reticulation is very evidently punctured, a character which is not mentioned in the description of either of the above species.

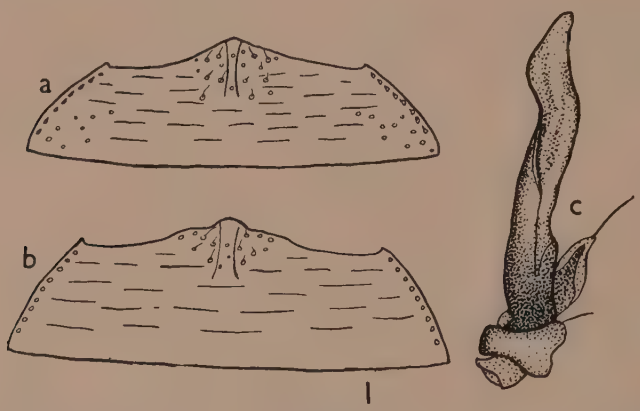


FIG. 1.—*Laccophilus spadix* sp. n. Anal sternites. A, ♂; B, ♀; C, Aedeagus and parameres.

Holotype ♂, Caledon district, "stream with pools in pinewood," 1947 (*Omer-Cooper*).

Allotype ♀, same particulars as holotype.

Paratypes, 2 ♀, small vlei near Capetown, 1947 (*Omer-Cooper*).

Yola harrisoni sp. n.

Ovalis, postice angustior, modice convexa, rufo-testacea, opaca, reticulata; elytris adumbratis, regulariter dense punctatis, in medio utrinque carina sat fortiter elevata post medium haud angulatim desinente, carinulisque duabus obsoletis externis instructis; subta rufo-testacea, antennis pedibusque testaceis. 1·8 × 1·0 mm.

Dull, reddish testaceous with the elytra vaguely marbled with brown; the inner elytral keel is moderately raised, at the apex descending gradually without any marked angle, the outer keels scarcely raised at all.

Head reddish testaceous, rather narrow with the eyes proportionately large; reticulate and sparsely punctate anteriorly, closely punctate on vertex, antennae testaceous. *Pronotum* reddish testaceous; anterior and posterior borders narrowly brown, sides finely

bordered ; very slightly narrowed in front, then straight to the base, which is only very slightly wider than the anterior border and slightly narrower than the base of the elytra ; densely and evenly punctured, obscurely reticulate, more evidently so at the sides and very obscurely pubescent ; pronotal striae oblique, about half the length of the pronotum with a well marked depression internal to them. *Elytra* reddish testaceous, vaguely marbled with brown, widest at shoulders, most convex in the middle, sharply narrowed in the posterior two-thirds ; the discal keels continuing the pronotal striae are only moderately raised and end gradually, the two outer very obscure ; densely evenly and shallowly punctured, obscurely reticulate, more evidently so at the sides and apex, very obscurely pubescent. *Underside* reddish testaceous, legs testaceous, aedeagus and parameres as in fig. 2B and C.

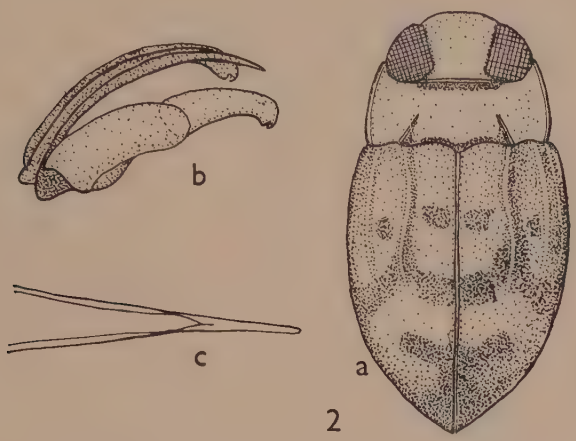


FIG. 2.—A, *Yola harrisoni* sp. n. ; B, aedeagus and parameres, side view ; C, dorsal view of tip of aedeagus.

Holotype ♂, Cape Town, Zeekoe Vlei, 1947 (*A. D. Harrison*).

Since the above description was written I have received four more specimens of this species from Mr. Harrison. In these the elytral pattern, though variable, is more definite than in the type, consisting of an anterior testaceous band, wider at the shoulders, somewhat interrupted in the middle by vague black markings, and a post median, narrower, irregular and less conspicuous testaceous band involving the ends of the discal keels ; the side margins, apex and some posterior inpushings are testaceous. In the lightest specimen the elytra are testaceous with vague clouding between the keels and definite black crescentic markings posteriorly, leaving, however, the apex and lateral margins testaceous. The females are reticulate.

Western Cape Province. Lower Berg River, 11.1950 (*A. D. Harrison*).

Bidessus imitator sp.n.

Regulariter ovalis, postice angustior, sat convexus, testaceus, elytris rufo-testaceis ; Clypeodytis simillimus ; capite testaceo, reticulato, tenuiter punctato, antennis testaceis ; pronoto testaceo, tenuiter punctato, utrinque ad basin plica obliqua fortiter impressa, in elytris sat longe continuata ; elytris rufo-testaceis, haud reticulatis, inter strias

fortiter punctatis ; striis suturalibus punctatis ; subtus rufo-testaceus, pedibus testaceis. 1·4–1·5 × 0·5 mm.

Oval, testaceous with reddish testaceous elytra, having all the appearance of an oval *Clypeodytes*.

Head with a cervical stria ; testaceous with vague darker markings, reticulate, clearly but sparsely punctured and with two shallow antero-lateral more closely punctate depressions ; clypeus testaceous, rounded, very finely bordered and slightly raised ; hind border thickened at the sides and continued across the head but very indistinctly so in the middle : antennae testaceous. *Pronotum* testaceous ; the anterior border and the posterior border between the striae reddish-testaceous ; sides margined, almost straight, slightly narrowed in front, basal width slightly greater than anterior width, posterior angles very slightly obtuse ; shining, not reticulate, sparsely and finely punctured on disc, more closely and less finely at sides and anteriorly ; sparsely pubescent, more evidently so at sides ; basal striae elbowed, attaining about half the length of the pronotum ; coarsely punctured

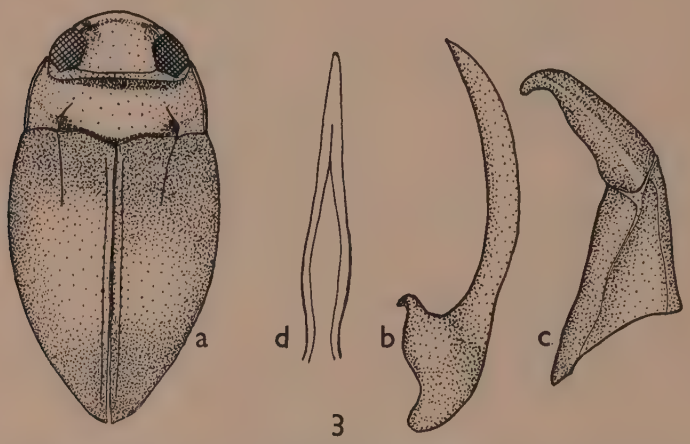


Fig. 3.—A, *Bidessus imitator* sp. n. ; B, side view of aedeagus ; C, left paramere ; D, dorsal view of tip of aedeagus.

depression lying just internal to the base of each striae. *Elytra* reddish-testaceous, shining, not reticulate, sparsely pubescent, less evidently so on disc ; discal striae little longer than the pronotal striae and attaining about one-quarter of the length of elytra ; punctuation moderately fine, coarser between the striae ; sutural striae punctate, not quite reaching the base or the apex ; the space between the sutural stria and the internal edge of each elytron is finely and sparsely punctate ; the sides gradually narrowed to just before the apex then obliquely truncate ; widest just before, most convex after the middle. *Underside* reddish-testaceous, head, legs and epipleurs testaceous, the latter punctured and showing indications of a cavity at the base ; coxal lines divergent with a line of coarse punctures lying internal to them continued on to the metasternum ; middle of metasternum with two divergent rows of similar punctures meeting those on the metacoxal processes ; meta-coxae with similar punctures arranged in two irregular oblique rows. ♂ aedeagus and parameres as in fig. 3B–D.

Holotype ♂, Knysna River (*A. D. Harrison*).
Allotype ♀, same particulars.

The following two Hydroporines I have assigned to the genus *Potamonectes* Zimm. owing to the formation of the meta-coxal processes, although neither of them appears to be completely typical of that genus. It is surprising to find representatives of this genus so far south.

Potamonectes capensis sp. n.

Ovalis, testaceus, elytris lineolis septenis angustis nigris longitudinalibus, quarum duae exteriores interruptae et ad maculos reductae, ornatis; ad apices dentatis; pronoto ad basin in medio transversim depresso, quam basis elytrorum vix angustiore; subtus niger, capite, prosterno, coxarum processibus, pedibus, epipleuris, abdomineque testaceis;

FIG. 4.—A, *Potamonectes capensis* sp. n.; B, prosternum; C, anterior tarsal claws of ♂; D, aedeagus and parameres.

prosterni processu lanceolato, marginato, in medio longitudinaliter carinato, inter coxas anteriores in tuberculo elevato; antennis pedibusque testaceis. ♂ 4·5 × 2·0 mm. ♀ 4·8 × 2·3 mm.

Testaceous, elytra with seven narrow black lines, the two outer broken and reduced to isolated spots, and the suture, black; obscurely toothed. Pronotum with a posterior shallow transverse depression, its base scarcely narrower than the base of the elytra.

Head testaceous, hind border narrowly and vaguely, and insertion of antennae, brown; micro-reticulate, evenly and rugosely punctate with scattered large punctures superimposed, especially evident on vertex and in the two antero-lateral depressions; antennae testaceous with apices of segments fuscous, the fourth segment equal to the third and fifth, maxillary palps truncate. *Pronotum* with a posterior shallow transverse depression; testaceous with anterior and posterior margins narrowly, a row of spots parallel with the

anterior margin, another parallel with the scutellary region of hind border and two transverse spots at the sides of the depression brown ; very sparsely pubescent, micro-reticulate, rugosely and evenly punctate with larger punctures evident on disc, in the depression, and forming an irregular row parallel with the anterior border and another with the scutellary region, irregularly wrinkled posteriorly at each side of the scutellary region ; sides scarcely rounded, slightly narrowed in front, evidently margined ; base sinuate, almost the same width as the base of the elytra, posterior angles rounded. *Elytra* testaceous with seven narrow lines not quite reaching the base or apex, black ; the first and third are shorter anteriorly, the two outer broken into isolated spots ; the fourth ends posteriorly in a crochet the forward arm of which does not quite reach the end of the fifth ; in the ♀ however the fourth and fifth lines are united posteriorly ; there is a basal row of black spots in the scutellary region, the outermost touching the base of the elytron just external to the beginning of the fifth line, the innermost touching the suture, which is also narrowly black ; evenly and finely punctate, less rugosely so than the pronotum, the serial rows of larger punctures very obscure ; micro-reticulate, obscurely pubescent, pubescence more evident on the serial rows, the apex and the sides ; a marginal row of longer hairs in the posterior third ; sides gently rounded, most convex behind the shoulders, in both sexes toothed where the epipleurs end. *Underside* : Sternum, with the exception of prosternal process, coxal processes, abdomen, legs and epipleurs, testaceous ; epipleurs thickly punctured, grooved posteriorly ; hind coxae and metasternum shining, closely punctured, almost rugosely so, obscurely micro-reticulate ; two patches on metasternum and hind border of metacoxae impunctate and reticulate ; abdominal sternites slightly more closely and rugosely punctate ; coxal lines turned outwards, slightly raised anteriorly, not quite reaching the metasternum ; ventral face of hind femora with an irregular row of setigerous punctures and closely punctured behind these ; external face of meta-tibiae with one row of spines, very finely punctate and almost micro-reticulate ; hind tarsi punctured, hind claws rather slender ; prosternal process lanceolate, bordered and keeled, punctate and, between the anterior coxae, slightly expanded and raised into a ridged tubercle (fig. 4B). ♂ segments of anterior tarsi slightly broader than in the ♀ ; inner claw scarcely longer than the outer but with base widened to form an obtuse tooth (fig. 4C) ; aedeagus and parameres as in fig. 4D. ♀ anterior tarsal claws equal ; base of elytra slightly wider than base of pronotum whose hind angles are more widely rounded : abdomen dark.

Holotype ♂, Cape Town, 1947 (*Omer-Cooper*).
Allotype ♀, Cape Town, 1947 (*Jackson*).

Potamonectes vagrans sp. n.

Ovalis, dense et aequaliter punctatus, testaceus ; elytris lineolis septenis longitudinalibus quarum duae exteriores plus minusve interruptae, suturalique nigris ; pronoto testaceo, ad basin maculis duabus transversis ornato ; ad basin quam basis elytrorum paullulum angustiore ; subtus rufo-testaceus, prosterno, coxarum processibus, segmento ventrali primo postice, fulvo ; antennis pedibusque testaceis ; prosterni processu late lanceolato, ad apicem nullo acumine, haud carinato, inter coxas anteriores in tuberculo elevato. 4·8–5·0 × 2·1–2·25 mm.

Rugosely and evenly punctured, testaceous with the suture, seven lines on each elytron, the outer two more or less broken and often not reaching the apex, black ; epipleurs not denticulate at apex. *Head* testaceous ; insertion of antennae, vague spots on vertex and hind border narrowly, brown ; rugosely and evenly punctured but with some larger punctures on disc and in the shallow lateral depressions (in some specimens the larger punctures are more evident and more numerous) ; antennae testaceous with apex of last joint brown, the fourth joint equal to the third and fifth. *Pronotum* testaceous, anterior and posterior border very narrowly, two transverse spots on either side of the scutellary region, a deep row of spots behind these and another irregular row parallel

with the anterior margin, brown ; sides rounded, slightly narrowed in front, indistinctly margined ; posterior angles rounded ; base very slightly narrower than base of elytra ; evenly and rugosely punctured but with two irregular anterior rows, two irregular rows between the posterior black spots ; scattered punctures on disc larger. Base between the spots wrinkled, more obviously so in the female ; sparsely and finely pubescent. *Elytra* widest behind the middle, from thence gradually narrowed to apex, which is not denticulate ; testaceous with seven black lines, the outer two broken into longitudinal spots ; the extent of the breaking of these two lines is very variable ; in some the outer lines are formed by three spots, the anterior humeral spot always being short, and the inner by two spots only, in others the inner line is entire and the outer has a posterior

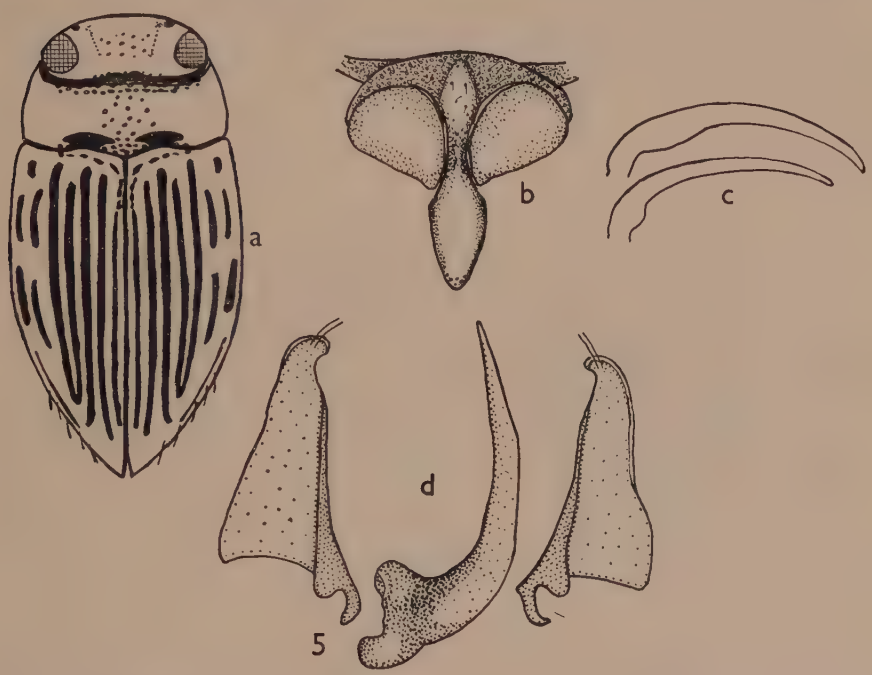


FIG. 5.—A, *Potamonectes vagrans* sp. n. ; B, prosternum ; C, anterior tarsal claws of ♂ ; D, aedeagus and parameres.

marginal line almost reaching the apex ; lines 4 and 5 are joined behind ; suture narrowly black and some black marks in the scutellary region, the inner not touching the suture, the outer touching the base of the elytron opposite the end of the fifth line, with which it is in some specimens joined ; rather finely and evenly punctured on an obscurely reticulate background ; there are traces of serial rows of larger punctures on all the black lines ; sparsely and finely pubescent with a lateral marginal row of longer hairs in the posterior third. *Underside* finely, evenly and rugosely punctate on an obscurely reticulate background ; reddish testaceous with tips of labial and maxillary palps, prosternal process, hind border of metasternum, metacoxal processes, outline of metacoxae and borders of first abdominal sternite, brown ; legs reddish testaceous, apex of hind femora and tibiae brown ; epipleurs testaceous with brown border, punctured ; prosternal process widely lanceolate with tip rounded, punctured, not bordered or keeled but, between the anterior coxae swollen and raised into a prominent mound (fig. 5B) ; coxal lines very slightly

turned out, scarcely raised, not reaching the metasternum, but in their anterior third bordered internally by a rather wide shallow groove which is continued up to the metasternum. Ventral surface of hind femora evenly punctured but provided with an indistinct irregular row of larger setigerous punctures; external face of hind tibiae provided with one row of spines and very finely punctured between this and the ventro-marginal row. ♂ anterior tarsal claws with the inner broader and longer than the outer (fig. 5c). Aedeagus and parameres as in fig. 5D. ♀ anterior tarsal claws more slender, more evenly curved and equal.

Holotype ♂, CAPE PROVINCE. Colesberg, 1947 (*Omer-Cooper*).

Allotype ♀, same particulars.

Paratypes: Grahamstown, 1926 (*Pickford*), 1947 (*Jacobs*), Cradock, 1946 (*Frank*), Stutterheim, 1949 (*Rogers*), Cathcart, 1949 (*Rogers*). TRANSVAAL: Ermelo, 1948 (*Omer-Cooper*).

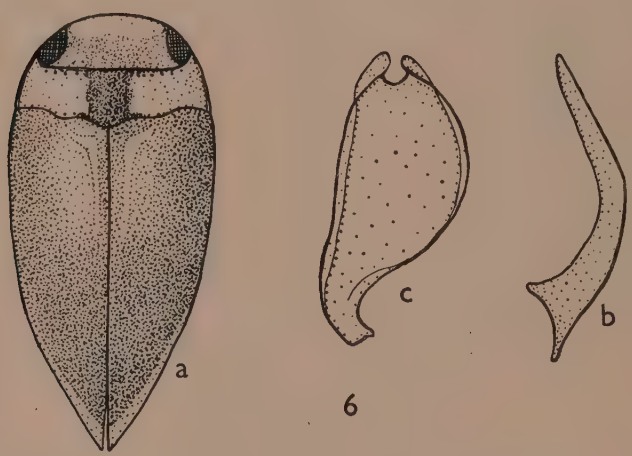


FIG. 6.—A, *Canthyporus laccophiloides* sp. n.; B, aedeagus, side view; C, paramere.

Canthyporus laccophiloides sp.n.

Elongato-ovalis, postice fortiter attenuatus, flavus, vix convexus, Laccophilis simillimus; elytris fusco-testaceis; antennis ad basin flavis, articulis reliquis nigrescentibus; pronoto flavo, in medio adumbrato, reticulato, tenuiter sed distincte, in disco fortiter, punctato; elytris sat fortiter punctatis; subtus pedibusque flavis. Long. 2·0 mm.

Yellow with the head reddish yellow and the elytra, except the sides and apex, suffused with brown. Elytra narrowed behind and not very convex, giving the insect a Laccophiloid appearance.

Head reddish yellow behind, yellow in front, reticulate, evenly punctate except the clypeus, where the punctures are sparse; antennae with first two joints testaceous, third and fourth dark at the apex, remaining joints brown, rather short but not very broad. *Pronotum* yellow, clouded with reddish yellow on disc, reticulate and punctate with an anterior and posterior row of punctures and spaced punctures more evident on disc—sides finely bordered. *Elytra* testaceous, in my specimens, which are teneral, thin and almost transparent, so that the body showing through gives the appearance of brown

elytra with the sides, apex and two indistinct distal stripes, lighter; reticulate and rather strongly punctate, the punctures finer towards the apex and some distinctly larger punctures at the base connecting the sutural row, which is rather indistinct, with the discal serial row. *Underside* yellow, including the epipleurs and legs. ♂ more shining, punctuation of pronotum finer and reticulation less pronounced than in the ♀.

Holotype ♂, Lakeside, Cape Town, 1947 (*A. D. Harrison*).

Allotype ♀, same particulars.

This species is evidently very close to *C. canthydroides* Rég. and *C. similator* Zimm. but it is smaller than either, the punctuation is more evident and the pronotum is not marked with black before and behind.

Book Notice.

Flora Malesiana. Vol. I. Edited by C. G. G. J. van Steenis. A cyclopaedia of Botanical Exploration, etc. By M. J. van Steenis-Kruseman. 8vo. Amsterdam (Noordhoff-Kolff N.V.), 1950. Pp. clii + 639 (2-column), 3 maps, text illust. Price 55 Dutch guilders.

It may appear somewhat unusual to announce here a book with a mere botanical title. Indeed, the *Flora Malesiana* is entirely devoted to the botany of the insular world between Asia and Australia, and its appearance in many volumes will certainly cover a period of many years. Volume I, however, is of interest to all entomologists who are concerned with the insect fauna of this large region, because in it is brought together a vast amount of detailed biographic and bibliographic data (and their sources) of several thousands of persons of all nations as well as native collectors who have collected plants for herbaria and museums up to 1950. Many of these plant collectors collected also insects or were interested in entomology, and conversely, many entomologists paid attention to the flora. This explains why the book contains so much useful information about many persons well known as entomological explorers. It may suffice to cite only some English names of reputation such as Boden Kloss, Miss Cheesman, Everett, Forbes, Moulton, the Pratts, Raffles, Shelford, and Wallace; there are many others. Of all explorers a detailed itinerary is given. Some 200 portraits illustrate the English written text.

The introductory part of the book reviews botanical work in Malaysia, gives an account of expeditions, etc., and describes the organisation needed for such expeditions into the tropical interior. These data may also be of use to the entomological collector and explorer. W. Roepke.

Book Notice.

A Provisional Check-list of the Butterflies of the Ethiopian Region. By Wallace Peters. 8vo. Feltham (E. W. Classey), 1952. Pp. 201. Price 45*s*.

No check-list of the butterflies of the Ethiopian region has appeared since Aurivillius compiled his *Systematisches Verzeichniss der Tagfalter der Aethiopischen Region* in 1899, and this did not include the Hesperiidae.

In the present work the author has made every effort to produce an up-to-date check-list, using the most recent nomenclature. The species dealt with are numbered within each genus and (in the right-hand margin) consecutively through the whole list. The actual systematic check-list covers pages 14–132. This is followed by a bibliography, running to eighteen pages, including most of the relevant papers which have appeared since Seitz' volume dealing with the African Rhopalocera, completed in 1925.

Comprehensive indices conclude this book, which will provide a useful tool for all workers on African butterflies.

Book Notice.

Fleas, Flukes and Cuckoos. By Miriam Rothschild and Theresa Clay. 8vo. London (Collins). 1952. Pp. xiv + 304. Price 21*s*.

This book forms one of the Special Volumes in the *New Naturalist* Series. Although primarily intended for the ornithologist and zoologist, the subject-matter is treated in such a way as to appeal to workers in a much wider field. The three parasites provide examples of the wide variety of animals which live in close association with birds, and their structures and life-histories combine to form a most entertaining scientific work. Throughout the volume the parasitic relationship has been kept in the foreground. Part One deals with the more general aspect of the subject. In Part Two an attempt has been made to present a close-up of two contrasting types of parasitic insects, the feather lice and fleas, in order to show in greater detail the intimate relationship which exists between host and parasite. In Part Three a brief survey is given of the various groups of parasites which attack birds in Great Britain.

A bibliographical appendix of fifteen pages, a general index, as well as indices of popular and scientific names and of the scientific names of birds mentioned in the text, complete the work.

The photographs and line drawings which illustrate the volume are of an exceptionally high standard.

A NEW SPECIES OF THRIPS, *THILAKOTHRIPS FIMBRIATA* SP. N. (THYSANOPTERA-TUBULIFERA), FROM SOUTH INDIA.

By T. N. Ananthakrishnan, B.Sc.

(*Lecturer in Zoology, Loyola College, Madras.*)

The genus *Thilakothrips* Ramakrishna[1] has hitherto been represented in India only by the single species *T. babuli* Ramakrishna. While the characteristic reticulation of the head and parts of the body and the peculiar fimbriate bristles are the generic features, *T. babuli* is also distinguished by the dome-shaped head, the reticulate tube and a meagre distribution of fimbriate bristles. The new species, described below, while exhibiting the significant features of the genus, differs considerably from *T. babuli* in the following essential characters:

1. Body and tube reticulate, head dome-shaped with lateral expansion, few fimbriate bristles on head and thorax . . . **T. babuli** Ramakrishna.
2. Tube not reticulate, head more or less cylindrical, with numerous fimbriate bristles on head and thorax . . . . . **T. fimbriata** sp. n.

Thilakothrips fimbriata sp. n.

Macropterous female: Length 1·7 mm. General colour yellowish-brown with dark grey markings. Head, with cheeks and apical region of mouth cone, darker. Eyes black and ocelli with a red pigment. Antennal segments 1 and 2 pale yellow, 3, 5 and 7 yellowish, 4, 6 and 8 dark brown. All femora greyish-yellow, tibiae proximally light brown, distally pale yellow; tarsi brown. Thorax concolorous with head, wings colourless, fringes brown. Abdomen golden yellow with sides darker. Basal quarter of tube pale yellow, the rest of tube being dark brown. All bristles colourless, except post-oculars, which are yellowish-brown.

Head almost as long as broad, broadest in the middle and slightly converging at either end. Surface below eyes distinctly reticulate showing polygonal areas. The cheeks are crenulate, armed with six small fimbriate bristles on each side. Vertex almost occupied by the bases of the antennae, leaving a very small antennary process. Ocelli with a red pigment, arranged in an equilateral triangle, the hind ocelli being placed slightly above the base line of the eyes. Eyes prominent, large, oval and occupying about half the length of the head. Interocular space much wider than width of an eye. Postocular setae normal, pointed, situated very close to hind margin of eyes, almost as long as length of an eye. Mouth cone broad at base, abruptly narrowing towards apex, moderately pointed and almost reaching base of prosternum. Antenna about one and a half times as long as head, filamentous, 1st segment cylindrical, as long as broad; 2nd segment narrow at base and widening at apex with rounded sides, 8th segment broadly united to the 7th forming an elongated cone. Sense cones prominent, with one on segment 3 and two colourless cones on segments 4, 5 and 6.

Prothorax short, about three-fifths length of head. Surface uneven, not distinctly reticulate. A pair of well-developed lateral fimbriated bristles, situated on a colourless elevation, and another pair of smaller postero-lateral fimbriate bristles present; pterothorax as long as head and thorax together, with sides more or less convex. Surface uneven, and sides provided laterally with 6–8 pairs fimbriate bristles.

Legs: Anterior femora stout, incrassate, inner margin crenulate with one or two

[1] 1928, *Mem. Dep. Agric. India Ent.*, **10**: 278.

sharp setae. Outer margin fringed with numerous bristles, the proximal one fimbriate, distal ones more or less tubular, with dilated ends. Tibia with a few fimbriate bristles at base, but provided at its distal end with ordinary bristles. Anterior tarsus with a small tooth at its inner margin.

Mid and hind legs also clothed along their outer border with fimbriate and clubbed bristles, their inner margins bearing ordinary setae.

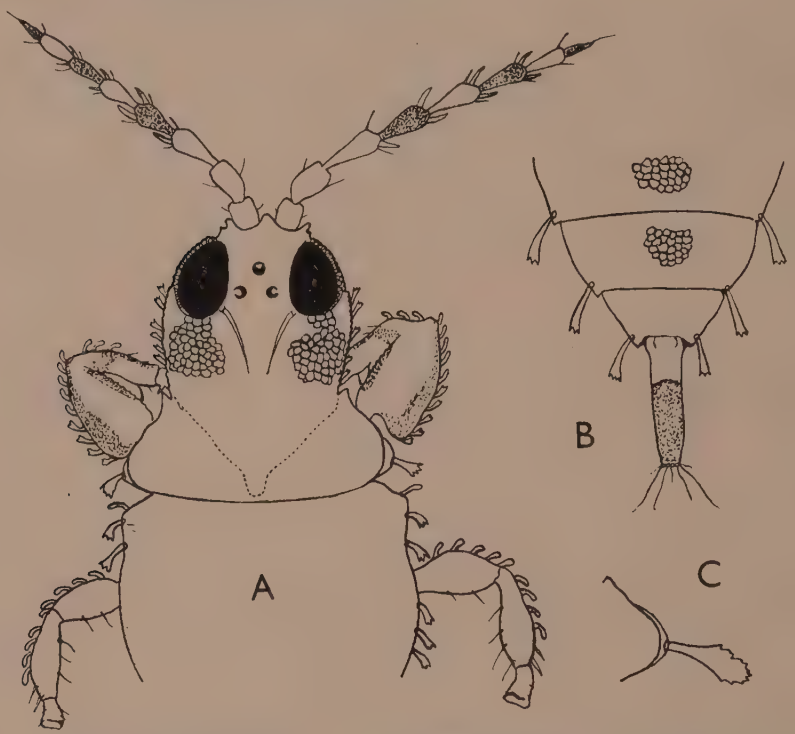


Fig. 1.—*Thilakothrips fimbriata* sp. n. A. Head and prothorax. B. Terminal abdominal segments and tube. C. A typical fimbriate bristle.

Wings reaching 7th abdominal segment, not narrowed in the middle; wing fringes brown (unfortunately wings are folded on back).

Abdomen longer than head and thorax, broad at base and gradually tapering behind, with sides projecting. The transverse chitinous band with bud-like projection in each abdominal segment and the network of small bristles seen in *T. babuli* totally absent. All abdominal segments provided with a pair of long, fimbriate bristles. Tube not reticulate, about two-thirds as long as head; tube bristles weak, shorter than tube, outer ones longest and about one-third as long as tube; surface of tube with four microchaetae on each side.

Total length of body, 1·71 mm. *Head:* length, ·261 mm.; width, ·25 mm. *Prothorax:* length, ·145 mm.; width, ·348 mm. *Pterothorax:* length, ·319 mm.; width, ·392 mm. Length of *abdomen*, ·986 mm. *Wings*, ·797 mm. *Tube*, ·188 mm. *Antenna*, ·435 mm.

Holotype (only specimen), ♀, S. India: Madras, 1.xii.51, from Lantana flowers. In the author's collection No. 73.

The author feels much indebted to Dr. T. V. Ramakrishna Ayyar, the Indian Thysanopterist, for confirmation of his identification and useful suggestions.

ON THE SPECIES OF *CRYPTOCHEILUS* PANZER (HYMEN., POMPILIDAE).

By L. Móczár.

As shown by the papers of Junco (1942–43), Haupt (1926–27, 1934), Berland (1925), Šustera (1938), Wilcke (1943) and de Beaumont (1951), the number of species of *Cryptocheilus* quickly decreases northwards of the Mediterranean faunal province and they are gradually replaced by species of *Priocnemis*. Because of favourable climatic conditions, as for instance in the Middle Danubian Basin, some species are able to reach Slovakia and the southern parts of Moravia. Some *Cryptocheilus* species may also be found in the smaller Basin (e.g., Transsylvania), but their further invasion is impeded by the Czechoslovakian-Moravian Hills and the Carpathians.

The species collected in the Middle Danubian Basin and the Carpathians are dealt with in the present paper. The distribution of the species is given, together with their ecological characters (Móczár, 1950), and all detailed faunistic information is enumerated in the new Fauna Catalogue (Móczár, 1952).

Key to Species of *Cryptocheilus*.

Females.

1. Abdominal tergites red and black or brownish-yellow, never with lighter well-defined white or yellow spots or stripes . . . . . 2.
–. Abdominal tergites red or black, always with well-defined lighter spots 6.
2. Scutellum remarkably convex seen from the side; very broad cuneolus between it and mesonotum; head, antennae, pronotum, mesonotum, ± scutellum, 2nd and following tergites of the abdomen straw-yellow; wings dusky yellow, fore wings with brown borders. 22–26 mm. Adriatic coast . . . . . 1. **annulatilis** (Richards)
–. Scutellum not especially convex, cuneoli less developed; not straw-yellow . . . . . 3.
3. Body for the most part black, only 2nd tergite partly red, or tergites bordered with dusky red colour; legs only rarely brownish; third antennal segment longer than scape and pedicel together. 10–15 mm. Occurrence in Hungary is dubious . . . 3. **notatus** (Rossi)
–. Body, especially the abdomen, more extensively red . . . . . 4.
4. Third segment of antennae distinctly longer than scape and pedicel together; eyes somewhat narrower than half the breadth of frons; 1st and 2nd tergite as well as basal half of the 3rd, red. 10–15 mm. Probably hypereuryök intermediär[1] species, tending to eremophily 4. **affinis** (Van der Linden)
–. Third segment of antennae as long as or shorter than length of scape and pedicel together; relation of eyes to frons different . . . . 5.
5. Third antennal segment as long as scape and pedicel together; propodeum finely reticulated; design of postnotum different; eyes a little broader than eyes of the following species. 8–11 mm. Stenök eremophil[1] species . . . . . 5. **confinis** Haupt

[1] For interpretation of these terms see Carpenter, J. R., 1938, *An Ecological Glossary*. London: Kegan Paul.

–. Third antennal segment shorter than scape and pedicel together; propodeum coarsely reticulated; eyes as broad as half the breadth of the frons; postnotum with a narrow upper strip and a broader keeled, lower portion. 8·5–10 mm. Distributed in the Great Plains and in the mountains to 600 m. . . . 6. **szabó-patayi** Móczár

6. Body, except legs, partly red (from brown to red) . . . . . 7.

–. Body black, without reddish coloration, at most with bright (yellow or ivory-white) spots . . . . . 10.

7. Thorax always black, only 1st and 2nd tergites of abdomen red, more or less dusky-bordered behind; ivory-white are inner as well as outer border of eyes, both sides of pronotum and of mesonotum; a spot on 3rd and 4th abdominal tergite. Wings light brown, smoky with darker borders. 13–19 mm. Species with typical stenök eremophil[1] character. Here, however, only in the plains, only exceptionally ascending to over 200–300 m. . . . . 2. **egregius** (Lepeletier)

–. Thorax (propodeum) and abdomen partly red . . . . . 8.

8. Second tergite always with bright spots on each side. The 1st tergite rarely, 2nd never with a red spot. Pronotum and base of the mesothorax (episternum) mostly with light spots. Each eye two-thirds the breadth of half the frons. 8–11 mm. A characteristic euryök eremophil species . . . . . 11. **fabricii** (Lepeletier)

–. Second tergite often partly red; never light spots on sides; 1st tergite usually entirely red . . . . . 9.

9. Eyes equal to two-thirds the breadth of half the frons (12 : 20), which is less strongly punctured. Greater part of postnotum transversely wrinkled, only narrow hind strip keeled; temples, as seen from above, rounded behind eyes; a smaller, more common species. 8–9 mm. Species with stenök eremophil character 13. **elegans** (Spinola)

–. Eye three-fourths breadth of one half the frons (18 : 24), the latter strongly punctured; postnotum divided longitudinally in two equal parts, front part transversely reticulated, hind part keeled; temples convex behind eyes, less rounded; larger, rarer species. 12–14 mm. Stenök eremophil species . . . 12. **fulvicollis** (Costa)

10. Wings straw-yellow or darker-yellow; body nearly black, dull or only very slightly shining. Larger species . . . . . 11.

–. Wings greyish or at least little yellow; body shining, almost brightly; smaller species . . . . . 14.

11. Body, especially head, legs and propodeum with remarkably long, thick black hairs, with velvety close-fitting hairs covering body; third segment of antennae shorter than pedicel (30 : 36); outer and inner borders of eyes with one small yellow spot, rarely a yellow spot on both sides of pronotum, on scutum; and a yellow stripe on both sides of 2nd, 3rd, 4th, also occasionally of the 5th tergite; the latter often not distinctly visible owing to contraction of abdomen. 16–17 mm. Species with stenök eremophil character 7. **ichneumonoides** (Costa)

–. Body not covered with such long hairs; 3rd segment of antennae longer than pedicel and scape together . . . . . 12.

12. Body black, the light-coloured spots ivory-white, namely: both sides of clypeus (rarely), inner as well as outer borders of eye, indis-

tinct spots on both sides of pronotum, a circular spot on the scutum, (rarely) a spot on the postscutellum, a spot on both sides of tergites 2–5. Antennae and part of the legs rusty-red; hind ocelli as far from each other as from the eye margin. 13–18 mm. Stenök eremophil species . . . . . 8. **simillimus** Haupt

–. Body black; light spots yellow or rusty-red . . . . . 13.

13. Third antennal segment four times as long as its width at the tip; clypeus rounded below in a flat arch; propodeum strongly and regularly transversely wrinkled; hind ocelli further from eye margin than from each other (22 : 20); inner border of eyes and a pair of spots on each of tergites 2–5 bright yellow; lower side of antennae, outer eye-margins, vertex, pronotum, a spot on the scutum, tegulae and legs (partly) yellowish-red; scape and pedicel darker brown. Head behind eyes remarkably broadened. 19–23 mm. Stenök eremophil species . . . . . 15. **octomaculatus** (Rossi)

–. Third antennal segment five times as long as its width at the tip; anterior margin of clypeus rounded in an arch, in colour resembling the previous species, from which it is hardly distinguishable; antennae entirely light coloured; pronotum often has rusty-red spots on the sides. 12–20 mm. Presumably stenök-eremophil species 14. **bicolor** (Fabricius)

14. Each of the 2nd, 3rd and 4th tergites with a pair of spots or stripes . . 15.

–. 2nd tergite with a pair of spots, 4th with stripe; 3rd tergite only rarely and 2nd and 4th with very small spots, and these stand well apart from one another . . . . . 17.

15. Thorax black; 12 mm; inner eye margin, 2nd and 3rd tergites, 4th tergite (rarely) with pale spots; temples broader than eye; propodeum densely, but fairly finely reticulated; femora and tibiae red. 12 mm. Collected in Southern hills and the sea-coast. Little known . . . . . 18. **guttulatus** (Costa)

–. At least pronotum, scutum and scutellum with pale spots, 12–18 mm. . 16.

16. Two separate spots on 4th tergite. White spots on upper part of outer orbit. Ocelli form an obtuse angle (almost a rectangle). Ocelli as far from eyes as from each other. Clypeus with a narrow, smooth border. Spots of the pronotum small. Mesepisternum distinctly wrinkled. 12–17 mm. A typically euryök eremophil species . . . . . 9. **sexpunctatus** (Fabricius)

–. Spots of 4th tergite fused into a stripe. Outer orbit black, at the most on the lower part with a very small white spot. Ocelli form a distinct flat, obtuse angle. Ocelli farther from eyes than from each other. Clypeus with a broad smooth border. Spots of pronotum well developed. Mesepisternum only wrinkled posteriorly. 9–12 mm. . . . . 10. **richardsi** sp. n.

17. Bigger species, of 10–14 mm; sides of propodeum slightly curved outwards, seeming in consequence to be shorter; its surface strongly transversely wrinkled, ocelli forming a sharper obtuse-angle. 9–13 mm. Hypereuryök intermediär species; can be found everywhere 16 **versicolor** (Scopoli)

–. Smaller species, of 8–13 mm.; sides of propodeum straight, seeming to be longer, wrinkles on surface much finer; middle and hind femora red. 7–11 mm. Hypereuryök intermediär species 17. **formicarius** (Christ)

Males.

1. Pronotum short, in the middle shorter or at most as long as half its front breadth; scutellum seen from the side convex; propodeum not elongated, more or less convex, rounded, not smooth, dull . . 2.
–. Pronotum elongate with parallel sides, in the middle much longer than half its breadth in front (if as long, see *Cr. octomaculatus*), declining abruptly in front; propodeum elongated, flattened; at least its horizontal portion smooth and more or less shining . . . 14.
2. Scutellum strongly convex, seen from the side projecting above dorsal surface; occiput, antennae, pronotum, 2nd and following tergites straw-yellow; wings similarly coloured, with borders brown; upper part of frons, scutum partly, postnotum, propodeum, first tergite, and hind border of following tergites, as well as ventral side of abdomen, entirely dull brownish-black; cuneoli conspicuously large. 17–18 mm. . . . . 1. **annulatilis** (Richards)
–. Scutellum less convex, clypeus, pronotum and abdomen not straw-yellow . . . . . 3.
3. Between postnotum and propodeum a shining, more or less keeled portion . . . . . 4.
–. No separately keeled portion between postnotum and propodeum . . 7.
4. 1st and 2nd tergites of different colour; 1st black, 2nd with a red spot; 3rd tergite and pronotum sometimes with light-coloured spot . . . . . 5.
–. 1st and 2nd tergite of the same red colour; 3rd tergite as well as pronotum lacking light spots . . . . . 6.
5. Body black all over, without yellowish spots, only 2nd tergite has a red spot; lower side of antennae, from sixth segment with a longitudinal row of short hairs; wings slightly dusky, fore wing with brownish margin. 7–12 mm. . . . . 3. **notatus** (Rossi)
–. Besides the dark-reddish spot on the 2nd tergite, ivory-white spots are present on both sides of the 3rd. Of the same colour are: inner and outer eye-margins, pronotum, a spot on the scutum; the latter two often wanting on smaller specimens, antennae without rows of hairs; wings dusky brown. 9–16 mm. . . . 2. **egregius** (Lepeletier)
6. First two tergites, as well as anterior part of 3rd, red; inner eye-margin ivory-white below; 6–9 segments of antennae with a row of short hairs; propodeum somewhat elongated, its horizontal portion more finely wrinkled than its oblique part. Bigger species, 8–10 mm. . . . . 4. **affinis** (Van der Linden)
–. Only the first two tergites red; inner eye margin below, near antennae, yellow, at most dark brown; antennae with row of hairs on lower side; smaller species, 7 mm. . . . . 5. **confinis** Haupt
7. Propodeum red . . . . . 8.
–. Propodeum black . . . . . 10.
8. Propodeum orange-red, postnotum, postscutellum and legs partly of the same colour, elsewhere black; on larger specimens the following parts are often ivory-white: inner and outer eye-margin, both sides of pronotum, a pair of spots on base of proepisternum and on 2nd and 3rd tergites, a stripe on 4th tergite; wings slightly dusky with dark margins. 7–10 mm. . . . . 11. **fabricii** (Lepeletier)
–. Propodeum not orange red; abdomen black or black and red, often with lightish spots . . . . . 9.
9. Propodeum blood-red, 1st and 2nd tergites more or less red, but some-

times black; ivory-white are: inner eye-margins below, two spots on 3rd tergite; wings slightly dusky. 8 mm. . 13. **elegans** (Spinola)

–. Propodeum, pronotum reddish-brown, 1st and 2nd tergites as well as legs of same colour, elsewhere black; ivory-white: (often) inner eye-margins, two spots on pronotum, a spot on 3rd tergite; wings slightly dusky. 14 mm. . . . . 12. **fulvicollis** (Costa)

10. Antennae reddish-ferrugineous or ferrugineous, only scape and pedicel black; body black with the following yellowish spots: inner and outer eye-margins, a spot on the scutum, a pair of spots on the 2nd, 3rd and 4th tergites; no spots on first tergite; legs red with the base black. (13–17 mm.) . . . . . 8. **simillimus** Haupt

–. Antennae, at least above, black . . . . . 11.

11. First tergite black, body hardly hairy. Smaller species, 7–11 mm. . . 12.

–. Either the 1st tergite with white spot, or body densely covered with blackish hairs; larger species, 11–18 mm. . . . . 13.

12. Lower parts of inner eye margins, 2nd, 3rd tergite with whitish spots. Middle femora reddish. Scutum, postscutellum black. 7–11 mm. 17. **formicarius** (Christ)

–. Inner eye margin, 2nd tergite, middle femora black. Scutum, postscutellum with a whitish spot. 9 mm. . . . 18. **guttulatus** (Costa)

13. Body without dense hairs; first tergite always with white spot on its basal part. Other white spots: clypeus, inner and outer eye-margin, on pronotum, scutum, postscutellum as well as on 2nd and 3rd tergite; wings dusky, not yellow; propodeum broader than long, obtusely wrinkled, wrinkles beginning at about the middle. 9–11 mm. . . . . 9. **sexpunctatus** (Fabricius)

–. Body densely covered with hairs, 1st tergite always black; yellow spots on outer and inner eye-margin, on pronotum and scutellum as well as on 2nd, 3rd and 4th tergite, but mainly they are small and insignificant, wings dark straw-yellow with brownish margins; propodeum somewhat longer than broad, transversely wrinkled. 11–14mm. . . . . 7. **ichneumonoides** (Costa)

14. Wings straw-yellow, with brownish margin extending partly to the cells. Larger species, 14 mm. . . . . 15.

–. Wings smoky-grey with black margins. Smaller species, 7–9 mm. Propodeum, or at least its horizontal portion, smooth, elongated; pronotum remarkably long, its length and breadth (in front) being as 50 : 35, 60 : 35, 43 : 30 respectively. Black; hind femora always, middle ones sometimes partly red; inner and outer eye-margin, scutum, both sides of end of propodeum, 2nd and 3rd tergites with ivory-white spots (on 2nd tergite this is sometimes wanting); sides of the pronotum with very slight furrows. 7–9 mm. 16. **versicolor** (Scopoli)

15. Pronotum hardly longer than half its breadth in front; propodeum faintly shining, hinder portion strongly wrinkled; head slightly broadened, rounded, pronotum gradually sloping, without sharp ledge; pronotum black. 14 mm. . . . 15. **octomaculatus** (Rossi)

–. Pronotum nearly as long as wide in front; propodeum smooth, brilliant, shining, only in its hind fifth with longitudinal wrinkles; head much broadened, having together with the pronotum a sharp ledge; pronotum with wide, brownish-red stripe on both sides. 14 mm. . . . . 14. **bicolor** (Fabricius)

Cryptocheilus richardsi sp. n.

♀. 9–12 mm. in length. Black, with white spots. White spots: fairly broad line on inner eye-margin to two-thirds length of eyes; outer eye-margin over the mandibles with a small spot, on both sides of pronotum a more or less rectangular larger spot, round spot on scutum and a similar one on postscutellum. A pair of spots on 2nd and 3rd tergite, a line on 4th tergite. Lower side of antennae brown. Mandibles and legs from coxae rust-coloured. Hair sparse, except on end of abdomen, which is covered with rust-coloured hair.

Wings resemble those of *Cr. sexmaculatus*. Nervulus not so far post-furcal. Nervellus, on the contrary, farther postfurcal. The 2nd cubital cell very much smaller than 3rd.

Ocelli form an obviously obtuse-angle. POL : OOL = 11 : 15. A short, shining furrow above the antennae. Frons : eye = 30 : 17. Clypeus convex, rounded in the lower part, with a smooth, broad border. Head strongly broadened behind eyes. Temple : eye = 25 : 25. Pronotum short, excised in an obtuse angle. 3rd antennal segment : 1 + 2 = 33 : 33. The deep lying postnotum equal in length to half postscutellum. Postnotum shining in middle, elsewhere wrinkled. Propodeum very convex, with a central sulcus, its surface relatively strongly transversely wrinkled, the wrinkles reaching at the sides to the episternum. On abdomen scattered punctures.

♂. Unknown.

Description based upon holotype ♀ and 5 ♀ paratypes.

Distribution: Middle Danubian Basin: I_1. Budapest, Kunszentmiklós, Paks, Szabadka (= Subotica).—II_2. Pécel.

Phenology: Flies in June, July and August (30.vi, 6.vii, viii).

This species has been named by me in honour of the eminent Hymenopterist, Dr. O. W. Richards. Cotypes in Collection of the Hungarian Museum of Natural History, Budapest, and in the Collection of Dr. O. W. Richards.

References.

De Beaumont, J., 1951, Hyménoptères des environs de Neuchâtel. *Bull. Soc. neuchâtel. Sci. nat.*, **74** : 29–31.

Berland, L., 1925, Hyménoptères vespiformes: I. *Faune de France* **10** : 212–283. Paris.

Haupt, H., 1927, Monographie der Psammocharidae Mittel-, Nord- und Osteuropas. *Dtsch. ent. Z.* **1927**, Beihefte 1–367.

——, 1934, Psammocharidae mediterranae: II. *Boll. Lab. Ent. Bologna* **7** : 263–302.

Junco y Reyes, J. J. del, 1942–43, Himenópteros de España. Psammocharidae (Olim. Pompilidae). *Eos, Madr.* **18** : 293–338; **19** : 79–118, 223–266.

Móczár, L., 1950, Notes on the Pompilid species in the Carpathian Basin (Hym.). *Int. Congr. Ent.* **8** (Stockholm) : 438–446.

——, 1952, Utonállódarazsak (Hym.: Pompilidae). Die Wegwespen (Hym.: Pompilidae). *Folia ent. Hung.* **5** : 73–108.

Šustera, O., 1938, Psammocharidae (Olim. Pompilidae.—Hrabalky) *In* Bata: Prodromus Hymenopterorum Čecho-Slovakiae, Pars II. F. Vespoidea. *Sborn. ent. Odd. nár. Mus. Praze* **16** : 196–223.

Wilcke, J., 1943, De Nederlandse Pompilidae. *Meded. LandbHoogesch. Wageningen* **47** : 1–88.

A NEW SPECIES OF *TENUITARSUS* I. BOLÍVAR, 1904, FROM THE SUDAN (ORTHOPT., ACRID., PYRGOMORPHINAE).

By D. Keith McE. Kevan, B.Sc., A.I.C.T.A., F.R.E.S.
(*University of Nottingham.*)

During current investigations in respect of the genus *Chrotogonus* Audinet-Serville, 1839, certain Sudanese material of the allied genus, *Tenuitarsus* I. Bolívar, was received from various institutions and individuals. The taxonomy of this genus was known to be in an unsatisfactory state, but the Sudanese specimens, subsequently augmented by a long series in the British Museum, proved to belong to a new species. The description of this, however, necessitated a re-examination of the previously described species.

Up to the present the number of species described or subsequently placed in the genus is three, namely *T. angustus* (Blanchard), *T. revoili* I. Bolívar and *T. evansi* (Uvarov). Uvarov (1924) has already cast doubts upon the validity of the type species, *T. revoili*, considering it to be, in all probability, conspecific with *T. angustus*. Innes (1929) accepted this tentative synonymy without query, but Uvarov had not examined the type of *T. revoili* and at the time had only seen a few Egyptian specimens of the genus, apart from the distinctive Iraqi material originally described by him as *Leptoscirtus evansi* (Uvarov, 1921). More recently I have followed Uvarov in again suggesting the same synonymy (Kevan, 1951).

I have now been able to examine specimens of *Tenuitarsus* which have been carefully compared with the type of *T. revoili* and I have also seen the type, " cotype " (allotype) and all paratypic material of *T. evansi*.[1] These have all been compared with Savigny's (1825 ?) figures 1_1, 1_2 etc. of his Pl. VI (which represent the type of *T. angustus*)[2] and with Egyptian, North and North-West African, Sudanese, Somali, Arabian, Israeli and Persian material in the British, Oxford, Paris and Helsinki Museums and in the collections of Dr. R. Ebner, of Vienna, and of the Instituto Español de Entomología, Madrid.

The examination of all this material has led me to the conclusion that not only was Uvarov correct in synonymizing *T. revoili* with *T. angustus*, but that *T. evansi* is conspecific with it also. It appears that *T. angustus* occurs in a

[1] Paratypes were stated by Uvarov (1921) to be in the Edinburgh (i.e., Royal Scottish) Museum, but they were never actually deposited there until recently, when they were kindly presented by Mr. Evans. They consist of a female bearing the same data as the type: " Jebel Hamrin, N.E. of Baghdad, gravelly slope, 13.xi.1918 (*W. E. Evans*)," and a male and a female with the same data, but 11.xi.1918, and another female from the same locality but " On gravelly soil, 26.xi.1918."

[2] A female specimen in the University Museum, Oxford, and bearing the data, " Egypt, near Cairo, Desert S. of Sphinx, 17.iv.1909 (*Mrs. Longstaff*)" agrees sufficiently fully in general appearance, in detail and in measurements with Savigny's admirable illustrations to be regarded as truly typical of *T. angustus* (herein it is designated the *neotype* in the event of this term finding general acceptance). It should perhaps be noted, however, that, seen from above, the antennae appear to be 8-segmented but the third segment is divided beneath to give nine as in Savigny's figure.

number of ill-defined ecological forms which are probably unstable and grade into each other in transitional ecological formations. The type of *T. evansi* and the " neotype " of *T. angustus* represent fairly nearly, but not absolutely, the extremes of variation, while homoeotypic *T. revoili* occupies an intermediate position inclining, if anything, towards *T. evansi*.

Uvarov (1921 and 1924) indicates the differences between *T. evansi* and *T. angustus*. These are the shorter antennae, the greater degree of rugosity of the head, pronotum and tegmina, the more distinctly marginate temporal impressions, the broader tegmina and the darker, more variegated, greyish (instead of sandy-yellow) coloration. All these distinguishing features are variable, however, and the differences (except in coloration) are of considerably less magnitude than may be found between individuals of a single sufficiently large population of almost any species of the allied genus, *Chrotogonus* (as will be shown elsewhere). Indeed, although there might be some justification for recognizing at least the extreme forms as ecological races, study of a fairly large amount of material shows variation in all characters within series (even in the internal genitalia—see p. 52), so that it is often difficult to assign a specimen definitely to one particular form or another.

The antennae and also their individual segments may vary somewhat in length, the actual number of segments discernible may differ in different specimens, and it has already been noticed (footnote, p. 41) that segmentation may be incomplete, giving an apparently different number of segments when a single antenna is viewed from two different aspects. Normally there seem to be nine segments (including the scape), but this number may be increased or decreased by at least one, according to the degree of fusion in the third segment and in the antennal club (which consists, for the greater part, of a single composite segment). Further to this it may be noted that, unlike the type, the female " co-type " (allotype) and one of the female paratypes of *T. evansi* have 9-segmented antennae, although segmentation is admittedly a trifle weak. The temporal impressions likewise provide no constant character since, in otherwise typical *T. evansi*, they may be relatively indistinct or, in typical *T. angustus*, strong. It might also be noted in this connection that in more heavily pigmented forms the impressions are dark in colour, which emphasizes their margins. The relative width (and length) of the tegmina also varies within a series, as does the degree of rugosity of the head and pronotum. Even the relative size of the eyes may vary within narrow limits. The coloration in specimens from any one locality, on the other hand, seems to be comparatively uniform in general character, although the faint bluish tinge to the hind wings varies with the individual. Variation in size is considerable, especially in the female.[3] The shape of the sternal interspaces and the hind femora, on the other hand, although varying slightly, is fairly constant, and together with the proportions of the tarsal segments appears to have greater taxonomic value.

From the evidence available it seems that the colour of the background influences the coloration of the insect. Forms from grey, brown or yellowish

[3] The following variation in measurements occurs in the material examined: Length (head to tip of wings) ♂ 11–14, ♀ 14·5–21; ditto (head to apex of abdomen) ♂ 10·3–10·7, ♀ 13·5–18·5; antenna ♂ 2·2–2·3, ♀ 2·8–3·8; pronotum ♂ 1·7–1·9, ♀ 2·1–3·2; tegmen ♂ 7·5–9·9, ♀ 10·7–15·5; hind femur ♂ 6·0–7·0, ♀ 7·9–10·2 mm.

habitats acquire these colours, while red sand, such as is typical of much of Somaliland, produces reddish or pinkish forms. This, of course, is quite a usual occurrence in Acrididae, but the extreme forms here are very different in appearance.

There is also some evidence, although rather slender, to suggest that a gravelly or rocky habitat tends to increase the degree of rugosity of the head and pronotum. The underlying causes of differences in rugosity could conceivably depend upon the ability of the insect to bury itself in sand (*cf.* Uvarov and Volkonsky, 1939 ; Morales Agacino, 1944 ; Kevan, 1952). If it were unable to do this (as in a gravelly or stony locality) the sculpturation might perhaps be affected in some way. However, the degree of rugosity in *Chrotogonus*, so far as I am aware, does not seem to be influenced by any comparable factor. Only detailed genetical and ecological investigation could elucidate this point. *Eremogryllus hammadae* Krauss, a species with comparable digging habits, is apparently limited in distribution by suitable patches of wind-blown sand (Uvarov and Volkonsky, *l.c.*).

Thus in spite of the apparent dissimilarity between *T. angustus* and *T. evansi*, it is difficult to accord the latter even subspecific status, especially in view of the intermediate position of *T. revoili*. The full synonymy of *T. angustus* is as follows :

Tenuitarsus angustus (Blanchard, 1836) (figs. 2*b*, 2*c*, 3*c*, 3*d*, 4*b*, 8).

1825 ?, *** Savigny, *Descr. de l'Egypte*, Atlas **10** : pl. 6, fig. 1_1, 1_2, 1′, 1A, 1*a*, 1*c*, 1*f*, 1*i*, 1*i*˜, 1*j*, 1*o*, 1*n*.
1836, *Ommexecha angustum* Blanchard, *Ann. Soc. ent. Fr.* **5** : 624.
1839, *Ommexecha linearis* Burmeister, *Handb. Ent.* **2** : 657.
1884, *Chrotogonus angustatus* Blanch. [*sic* !], I. Bolívar, *An. Soc. esp. Hist. nat.* **13** : 38, 41.
1889, *Leptoscirtus Savignyi* Saussure, *Mitt. schweiz. ent. Ges.* **8** : 89.
1890, *Leptoscirtus linearis* Burm., Krauss, *Verh. zool.-bot. Ges. Wien* **40** : 253.
1902, *Leptoscirtus angustus* Blanch., Yakobson et Bianki, *Pryamokr. i Lozhnos. Ross. Imp.* : 191, 270.
1904, *Tenuitarsus Revoili* I. Bolívar, *Bol. Soc. esp. Hist. nat.* **1904** [4] : 90.
1905, *Leptoscirtus linearis* Burm. (1888) [*sic* !], Werner, *S.B. Akad. Wiss. Wien* **114** : 420.
1909, *Leptoscirtus linearis* Sauss., Werner, *Zool. Jb.* **27** : 117.
1909, *Tenuitarsus Revoili*, Bolívar, I. Bolívar, *Gen. Ins.* **90** : 6.
1910, *Leptoscirtus angustus*, Blanch., Kirby, *Syn. Cat. Orthopt.* **3** : 269.
1910, *Tenuitarsus Revoili*, Bol., Kirby, *ibid.* : 299.
1913, *Leptoscirtus angustus* (Blanchard), Rehn, *Bull. Soc. ent. Egypt* (1912) **5** : 50.
1918, *Leptoscirtus angustus* Sauss., Boyd, *ibid.* (1917) **10** : 101, 104.
1919, *Leptoscirtus linearis* Burm., Storey, *ibid.* (1918) **11** : 59.
1921, *Leptoscirtus evansi* Uvarov, *J. Bombay nat. Hist. Soc.* **27** : 63, **syn. nov.**
1924, *Tenuitarsus angustus* (Blanch.), Uvarov, *Tech. sci. Serv. Bull., Cairo* **41** : 36.
1924, *T. evansi*, Uvarov, *ibid.* : 37.
1929, *Tenuitarsus angustus* (Blanchard) Uvarov, Innes, *Mém. Soc. ent. Egypt* **3** (2) : 105.
1932, *Tenuitarsus angustus* (Blanch.), Bodenheimer, *Bull. Soc. ent. Egypt* **25** : 30.
1933, *Tenuitarsus* sp., Uvarov, *Proc. zool. Soc. Lond.* **1933** : 269.
1934, *Tenuitarsus angustus* Blanch., Chopard, *Mém. Soc. Hist. nat. Afr. N.* **4** : 115.
1935, *Tenuitarsus angustus* Blanch. Bodenheimer, *Arch. Naturgesch.* (N.F.) **4** : 198.
1938, *Tenuitarsus* spec., Uvarov et Tewfik, *Bull. Soc. ent. Egypte* (1937) **21** : 273.
1942, *Tenuitarsus angustus* (Blanch.), Hussein, *Bull. Soc. Fouad I. Ent.* **26** : 143, fig. 48.
1943, *Tenuitarsus angustus* Blanch., Chopard, *Faune de l'Emp. fr.* **1** : 335, 336, fig. 518.
1943, *Tenuitarsus angustus* Chopard, *C.R. somm. Séanc. Soc. Biogéogr.* **1943** : 60.
1945, *Tenuitarsus angustus* (Blanch.), Morales Agacino, *Eos, Madr.* **20** : 330.

1947, *Tenuitarsus angustus* (Blanch.), Morales Agacino, *ibid.* **23** : 270.
1948, *Tenuitarsus angustus* (Blanch.), Chopard, *Bull. Soc. Sci. nat. Maroc.* **25–27** : 196.
1949, *Tenuitarsus* sp., Uvarov, *Notul. ent., Helsingf.* **28** : 90.
1951, *Tenuitarsus revoili* I. Bolívar, 1904, Kevan, *Ann. Mag. nat. Hist.* (12) **4** : 718.
1951, *Tenuitarsus evansi* (Uv.), Bey-Bienko, *Opred. Faun. S.S.S.R.* **38** : 276, 280, fig. 571, 572.
1952, *Tenuitarsus angustus* (Blanch.), Kevan, *Mitt. schweiz. ent. Ges.* **25** : 87, 92.

It should also be noted here that Schulthess (1898) followed Bolívar (above) in using the invalid name, "*Chrotogonus angustatus* Blanch.," for what he took to be this species, but his specimens actually represented an entirely different insect which is described elsewhere (Kevan, 1952).

The following combinations of characters serve to distinguish roughly the three forms of *T. angustus* but variation and intergradation, even in single populations, is such as to render impossible the setting up of any arbitrary dividing line between one form and the next:

1. Typical form, *f. angustus* (Blanch.).

Colour sandy-yellowish to reddish, slightly mottled; head and pronotum usually rather smooth; tegmina usually distinctly surpassing the hind femora when at rest, sometimes to a considerable extent.

2. *f. evansi* (Uvarov).

Colour greyish to brownish, densely tessellated or mottled fuscous and whitish, sometimes with some reddish specks; head and pronotum distinctly rugose; tegmina sometimes rather broad or short (in the latter case only slightly surpassing the hind femora at rest).

3. *f. revoili* I. Bol.

Colour usually testaceous to reddish-brown, somewhat mottled or tessellated fuscous, commonly with bright reddish as well as brownish specks; sculpturation of head and pronotum variable; tegmina usually more as in *f. evansi*.

The recognition of these forms as taxonomic units would be valueless. There is also insufficient evidence to indicate the existence of geographical races.

Fig. 1 shows the distribution of *T. angustus* so far as it is known. It is based on the following specimens[4] and records (the material upon which the latter were based having in the great majority of cases been examined):

Spanish Sahara: Numerous records from thirty-seven localities in Rio de Oro and Saguia el Hamra (*see* Morales Agacino, 1945; 1947).

This material varies in coloration from pale sandy-yellow or yellowish testaceous mottled with reddish brown to reddish-brown mottled with fuscous. Specimens from Smara, Uad Arred, Uad Abogdag and El Aiun are especially dark although they are not referable to f. *evansi*; none is especially rugose although this character varies also. Several are indistinguishable from typical British Somaliland f. *revoili*.

Mauritania: Bir Oum Ghrein and Gara Larouia, Zemmour (*see* Morales Agacino, 1945); Fort Trinquet (*see* Chopard, 1948); Bou Zagresa, 1 ♀; Adbeïnat-Chrerig, Adrar (NW), 11.xii.1936, 2 ♂, 1 ♀; Rhat Atoui

[4] In the British Museum unless stated otherwise.

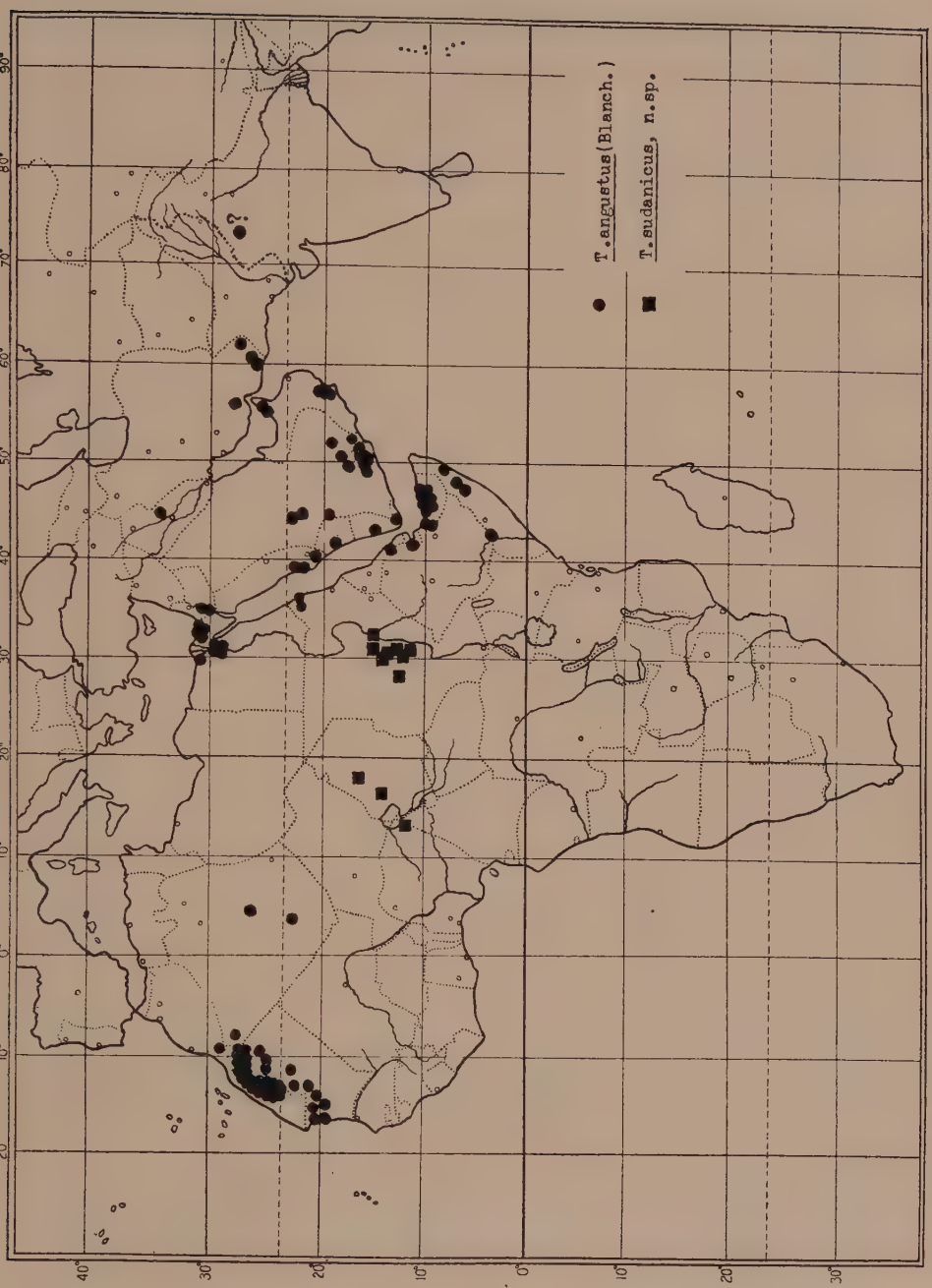


FIG. 1.—Map showing distribution of *Tenuitarsus* spp. Round spots indicate *T. angustus* (Blanch.), squares, *T. sudanicus* sp. n.

Imkebden, Tasiast, 6.ii.1937, 1 ♀; O–*d*. [? = Ouest de] Alzas, 20.ii.1937, 1 ♂; Alzas-Tanoudert, Dunes littorales, 21.ii.1937, 1 ♀; Hofrat el Agyaya, 11.vi.1938,1 ♀; O. Moulbein, 20.vi.1938, 1 ♀; Aguerguer, 22.vi.1938, 2 ♀.

Except for Morales Agacino's recorded material, the specimens are in the Paris Museum and all but the Bou Zagresa specimen were collected by the "Mission d'Études de la Biologie des Acridiens." The Bou Zagresa specimen is almost referable to f. *evansi* although less rugose; the Tasiast example is also rather dark brownish.

Southern Morocco: Tata [29° 41′ N., 08° 60′ W.], iv.1947, 1 ♀ (*L. Berland*)—aff. f. *evansi* (Paris Museum).

Algerian Sahara: Tindouf (*see* Morales Agacino, 1945); Hoggar, Tit (*see* Chopard, 1934); Ahaggar, Tamanrasset, vii–x.1935, 1 ♀ (*Zoehrer*) (in coll. R. Ebner).

Egypt and Sinai: Aboukir [Abu Qîr] (*see* Rehn, 1913); Romani, Mohammedia and Mazar (*see* Boyd, 1918); Gîza, Quassassin, Shurbra, Romani, E. Romani and Mohammedia (*see* Uvarov, 1924); El Arisch [El 'Arish] (*see* Bodenheimer, 1935); near Cairo (*see* footnote 2, p. 41).

Anglo-Egyptian Sudan: Khor Ardeb and Khor Shellal, 25–28.xii.1933, 4 ♂, 9 ♀; Khors Shellal and Ardeb, near sea, 30–31.xii.1933, 1 ♂, 2 ♀; Khor Shellal, xii.1933, 2 ♀.

All these specimens were collected by R. C. Maxwell-Darling. One or two approach f. *evansi* in coloration but the majority are pale testaceous with rather sparse but distinctive greyish-fuscous mottling.

Eritrea (S.): [Red Sea Coast] Khor Misha, 14.xii.1932, 1 ♀ (*R. C. M. Darling*)—aff. f. *evansi*.

French Somaliland: Ouersanguel [? 11° 55′ N., 42° 10′ E.], 1881, 1 ♀ (*Revoil*)—Type of *T. revoili* I. Bol. (Paris).

British Somaliland: Abdelkader to Salil, 3.iii.1948, 2 ♂, 1 ♀, 2 nymphs (*B. P. Uvarov*); Ali Wein, 14.ii.1949, 2 ♂, 1 ♀; Tug Hodma (E. of Karin), iii.1949, 1 ♂, 1 ♀; Betw. Karin and Las Musa, iii.1949, 2 ♂, 1 ♀; Biyo Dader, 15.iii.1949, 2 ♀; Mugub, 4 m. E. of Berbera, 1.iv.1949, 1 ♂, 1 ♀; Mount Elmis, 50 m. W. of Berbera, 4–6, v.1949, 6 ♀; Tug Ago Marodeh (25 m. S.W. of Berbera), 7.v.1949, 1 ♀; Mugub Sand Hills, 2.xi.1949, 1 ♂, 2 ♀.

Except where otherwise stated, all this material was collected by K. M. Guichard. The majority are pale testaceous with rather distinct fuscous or, less commonly, reddish-brown maculations. From the sand dunes of Mugub and elsewhere the specimens are coloured as in typical Egyptian examples and have the head and pronotum of comparable smoothness. On the other hand three females (one from between Karin and Las Musa, one from Ali Wein and one from Mt. Elmis) are rather dark and rugose and approach f. *evansi*.

Somalia: Galkayu (*see* Kevan, 1951); Galkayu, 20.x.1947, 1 ♂ (*Z. Waloff*); Godinlave (Mudugh), *c.* 6° 30′ N., 47° 7′ E., buried in sand, desert scrub, 8.i.1947, 1 ♀ (*D. K. Kevan*); Dolo, 4° 11′ N., 42° 5′ E., in sand with gypsum, desert scrub, 28.v.1947, 1 ♂, 1 ♀ (*D. K. Kevan*); near Eil (Mijertein), 1.xi.1947, 1 ♂ (*Z. Waloff*).

All these specimens are of a reddish or pinkish-red colour.

ARABIA: HEJAZ: Jidda, 1.iv.1927, 1 ♀ (*H. St.J. B. Philby*); Buraiman, Jidda, 9.xii.1946, 1 ♂, 1 ♀ (*A. R. Waterston*); Wadi Lith, 29.i.1946, 1 ♂ (*E. S. Brown*). 'ASIR: Shi-Aera nr. Qunfida, 5.ii.1946, 1 ♂ (*E. S. Brown*). YEMEN: Makhdasha in Tihama, 15 miles S. of Hodeida, on bare sand, 27.ii.1946, 1 ♂, 1 ♀ (*A. R. Waterston*). ADEN PROTECTORATE: Um Rija, x.1935, 1 ♀ (*R. C. Darling*). HADHRAMAUT: Horeida (*see* Uvarov and Tewfik, 1938); Wadi Thaljat [17° 13′ N., 52° 24′ E.], 18.iii.1947, 1 ♂, 1 ♀, 3 nymphs (*W. Thesiger*); Wadi Kidiut [= Kidyat, 16° 35′ N., 51° 30′ E.], 25.iii.1947, 2 nymphs (*W. Thesiger*); W. Lubaat [presumably = Wadi al Abat, 16° 30′ N., 50° 32′ E.], 6.iv.1947, 1 ♀ (*W. Thesiger*); Wadi Masila [at 16° 05′ N., 49° 30′ E.], 11.iv.1947, 1 ♂ (*W. Thesiger*); Wadi Ghail Omar, 9.vii.1949, 1 ♀ (*K. M. Guichard*). RUB'AL KHALI: Jarrād, Shenna, 1600 ft., 8.i.1931, 1 ♀ (*B. S. Thomas*) (recorded also by Uvarov, 1943[5]); Jinab, 17° 20′ N., 49° 55′ E., 15.ii.1946, 1 ♂, 1 ♀ (*W. Thesiger*); Malaya, 17° 10′ N., 49° 50′ E., 27.ii.1946, 1 ♂ (*W. Thesiger*). NEJD: Arabian Desert, S.W. Nejd, Tathlith Distr., Bani Shauhata, 23.iii.1932, 1 ♀ (*H. St.J. B. Philby*); Sirr, Khufafiya, 22.xi.1931, 1 ♂ (*H. St.J. B. Philby*); Tuwaiq, Shaib Makharr, 22.xii.1931, 1 ♀ (*H. St.J. B. Philby*). S. 'OMAN: Batin el Mahai [= Batin al Mahalim, 20° 12′ N., 57° 30′ E.], 29.i.1947, 1 ♀ (*W. Thesiger*); Wadi el Jarf [19° 46′ N., 57° 20′ E.], 30.i.1947, 1 ♂ (*W. Thesiger*); W. Baï [19° 35′ N., 57° 20′ E.], 4.iii.1947, 1 ♀ (*W. Thesiger*). TRUCIAL 'OMAN: Sharjah, 3.v.1949, 1 ♂, 1 ♀ (*G. Popov*); Sharjah, 30.xii.1949, 1 ♂ (*K. Guichard*); "Trucial Oman," ii.1950, 1 ♀ (*G. Popov*).

The Arabian material taken as a whole shows a great deal of variation. The Jinab male is notable for the great length of its wings. The Shenna specimen also has rather long wings and is unusually smooth in appearance, but there is no doubt that it merely represents a rather extreme variant of f. *angustus*, Uvarov (1933) being justified in his caution. The Jinab female is notable for its slightly more robust hind femora, while that from Tathlith has these a little more slender. So many intermediate conditions exist, however, that there is no reason to place much emphasis on these variants. The specimens from Aden and the Yemen, from Lith and Qunfida are very nearly typical f. *evansi*, while Jidda specimens are more referable to f. *revoili* and are comparable with those commonest among the Sudanese and British Somaliland examples; one female has very bright reddish maculations. The Nejd specimens (particularly that from Tathlith) are reddish and somewhat reminiscent of Somalia material. Two of the 'Oman specimens are f. *revoili*.

ISRAEL: Wadi el Araba, Wadi Menaje, 20.iii.1947, 1 ♀ (*A. Shulov*); Wadi el Araba, Qa'a Sand Dunes, 19.iii.1947, 1 ♀ (*A. Shulov*).

IRAQ: Type series of *T. evansi* (Uvarov) (*see* p. 41).

Some of the paratypes are more referable to f. *revoili* than to "typical" f. *evansi*.

[5] The data given are those of the original pencilled label. Those given by Uvarov appear only on the printed museum label which is inaccurate.

Persia (S.E.): Saravan. Bender Tschahbahar [Chahbar], Golf von Oman, 18.xii.1936, 2 ♀ (*F. Brandt*) (Helsinki Museum—recorded as "Iran" by Uvarov (1949)); Daschtiari, Kaschtak, iv.1949, 2 ♀ (*Makoui*); Kuhak, iv.1950, 1 ♂, 1 ♀ (*Salavatian*).

Mekran and Laristan: recorded without more precise localities by Bey-Bienko (*in* Bey-Bienko and Mishchenko, 1951).

All the Persian material seen by me is more or less referable to f. *evansi*, but that from Chahbar has the basic colour ochreous and that from Daschtiari rather reddish.

[India (N.W.): Bikaner, 1.xi.1949, 1 nymph (♀) (*B. P. Uvarov*).

It is, of course, impossible to determine this specimen with certainty, but I see no reason to doubt that it is this species. Its general coloration is mottled greyish-ochreous.]

Tenuitarsus sudanicus sp. n. (figs. 2, 2*a*, 3*a*, 3*b*, 4*a*, 5, 6, 7).

1934, *Tenuitarsus* sp. Maxwell-Darling, *Bull. ent. Res.* **25**: 75, 76, 79.
1948, *Tenuitarsus* sp. Golding, *Trans. R. ent. Soc. Lond.* **99**: 547.

Type: ♂, Anglo-Egyptian Sudan: Es Sidr,[6] on hard sand, 26.v.1933 (*R. C. M. Darling*) [British Museum].

Head: Antennae not quite so long as the head and pronotum together, clavate, the club elongate, cylindrical, feebly segmented basally, truncate apically, forming almost half the flagellum and densely beset with minute pits; basal half of flagellum seven-segmented, the basal segment pyriform, the second cylindrical, about twice as long as wide, and the remainder quadrate; scape more or less cylindrical, a little thicker than the basal segment of the flagellum. Eyes prominent, globose. Frons slightly inclined, somewhat rugose with a few scattered punctures; frontal ridge prominent and elevated between the antennae, narrowly sulcate, obsolete below the large median ocellus; lateral frontal carinae rather weak, somewhat sinuous. Vertex between the eyes a little more than half the width of an eye (as seen from above), concave with raised margins and a weak median carinula. Fastigium verticis short, declining towards the frontal ridge, broadly triangular, fully twice as wide as long; dorsal impressions rhomboidal with slightly raised margins. Occiput slightly rugose.

Thorax: Pronotum broader than long, somewhat rugose. Pronotal disc with a pair of indistinct tubercles in the prozona; anterior margin more or less transverse, somewhat sinuous; posterior margins broadly rounded-triangular; typical sulcus straight, well defined, cutting the weak median carina a little behind the middle; median sulcus placed a short distance before the typical sulcus, indistinct and irregularly arcuate. Prosternum with anterior margin raised to form a strong collar bearing a pair of very feeble lateral tubercles. Mesosternum broad, lateral lobes very large, longer than wide, adze-shaped, and each crossed by an indistinct impression running transversely from the base of the middle coxa; meso- and metasternal interspaces together forming a goblet-shaped area considerably longer than wide (fig. 2). Suture dividing meso- from metasternal interspace indistinct.

Wings: Tegmina narrow, not quite reaching the apices of the hind femora at rest. Hind wings projecting very slightly beyond the tegmina and extending as far as the hind femora.

Legs: Fore legs with somewhat incrassated femora; tibiae about equal in length to the femora; tarsi with the apical segment very slightly longer than the other two together. Middle legs slender, the femora considerably longer than the tibiae; apical tarsal segment

[6] This appears to be about Lat. 14° 52′ N., Long. 30° 5′ E.

only a little longer than the other two together (fig. 3*a*). Hind legs with relatively stouter femora than in *T. angustus* (*cf.* figs. 4*a*, *b*); tibiae slightly shorter than the femora and each bearing apically four very long, curved spurs, the outer dorsal one of which is noticeably the shortest; tarsi with the apical segment a little shorter than the two basal ones together and about equal to the first segment alone (fig. 3*b*).

Abdomen: Unspecialized; external genitalia as in *T. angustus* (fig. 5); posterior margin of tenth abdominal tergum excavate, the excision sinuously rounded; epiproct triangular, about as broad as long and with a faint median longitudinal impression; cerci conical, not quite extending so far as the apex of the epiproct; subgenital plate rounded.

Measurements: Length of body 11·0, antenna 3·0, pronotum 2·1, tegmen 9·4, hind femur 7·5 mm.

Coloration: Ground-colour sandy yellowish-buff with numerous scattered rust-red maculae, those on the tegmina being fairly regular and one on the mid-dorsal surface of each hind femor rather large; whitish maculae also present, noticeably in a row along the tegmen; upper and outer keels of hind femora with a few black specks; lower parts of hind femora and the hind tibiae pale ochreous. Eyes and tips of tibial spurs and spines brown. Hind wings hyaline, colourless, main veins very faintly bluish-tinged.

Allotype: ♀, Same data as type [British Museum].

Very similar to the type but larger, differing as follows: Sternal interspaces a little wider (fig. 2*a*); fore femora less strongly incrassated; cerci much shorter than the epiproct and the excision of the tenth abdominal tergum narrowly triangular and reaching to the posterior margin of the ninth as in *T. angustus* (fig. 6*a*). The valves of the ovipositor are similar to those of *T. angustus*, rather short and strongly curved with acute apices (fig. 6*b*). The coloration agrees with the type except that there are a few fuscous maculae in addition to the rust-red ones, especially on the fore and middle legs; hind wings a little more distinctly bluish.

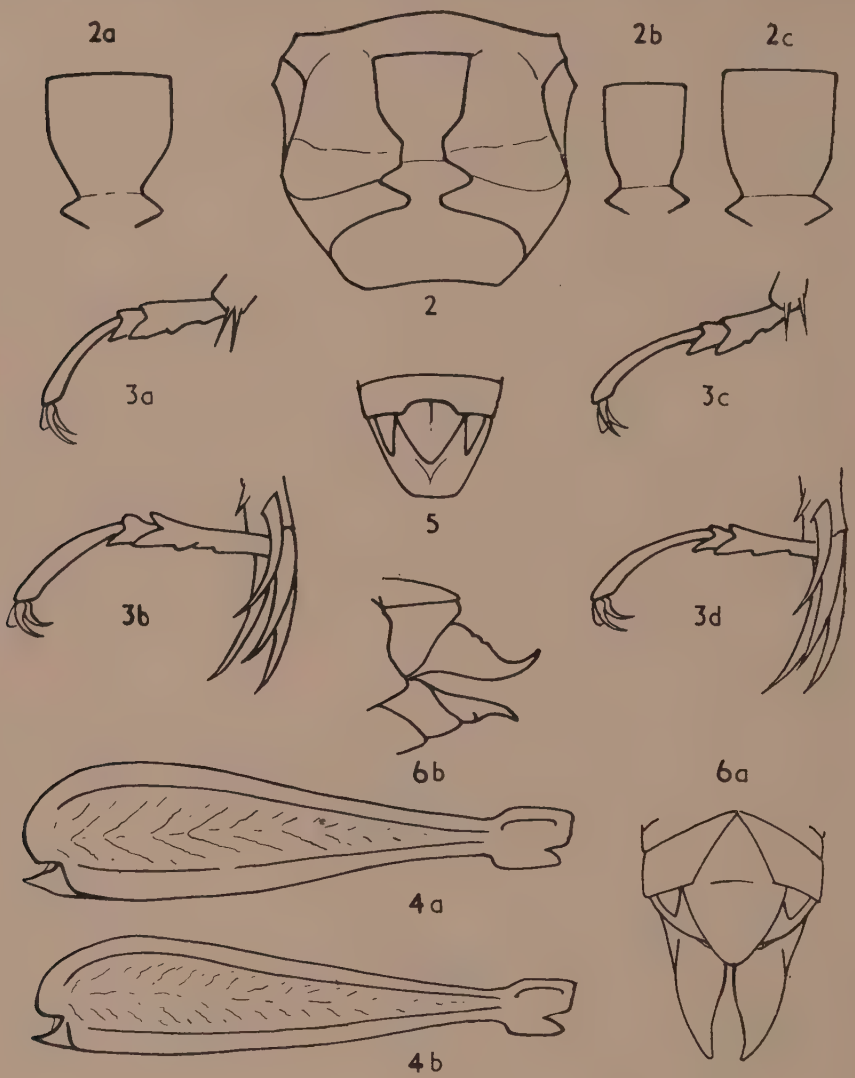
Measurements: Length of body 17·5, antenna 4·0, pronotum 3·1, tegmen 14·2, hind femur 11 mm.

Paratypes: Anglo-Egyptian Sudan: Same data as type, 8 ♂, 19 ♀; El Obeid–Bara, 5.iii.1914, 1 ♂, 1 ♀ (*R. Ebner*); Bara, 8.iii.1914, 1 ♂, 1 ♀ (*R. Ebner*); Um Ramad, 15.iii.1914, 1 ♂ (*R. Ebner*); "Sudan" [? near Khartum], 1 ♀ (*B. Pekkola*); Um Darag, on sand, 7.viii.1932, 1 ♂, 1 ♀ *in cop.* (*R. C. M. Darling*); Um Darag on *Goz*,[7] 24.viii.1932, 1 ♂, 5 ♀ (*R. C. M. Darling*); the same, 19.v.1933, 4 ♀; the same, 27.v.1933, 6 ♂, 6 ♀; the same, 3.vi.1933, 1 ♂, 4 ♀; the same, 6.vi.1933, 12 ♂, 16 ♀; the same, 25.viii.1933, 2 ♀; Bagbag, sand, *Panicum*, 12.i.1933, 1 ♂, 1 ♀ (*R. C. M. Darling*); Darfur, between Um Kedada and Um Kittia, viii.1934, 1 ♀ (*R. C. M. Darling*). French Equatorial Africa: Egueï, Tchad, vii.1935, 1 ♀ (*Mission d'Études de la Biologie des Acridiens*); Zigueï, Kanem, Tchad, 19–21.vii.1935, 1 ♀ (*Mission d'Études de la Biologie des Acridiens*).

The paratypes show some degree of variation in many features, comparable with, although not so extreme as that for *T. angustus*. They vary somewhat in size and coloration, although the majority are reddish-yellow in general appearance; the Chad specimens are rather pale. The hind wings may be faintly tinged with blue or not. The antennae vary, not only in total length, but in the length of the individual segments as well as in the number of the latter. Partial segmentation of the antennal club may occur in some, so that the number of antennal segments becomes a little difficult to assess. As in

[7] For explanation of this term and details of the locality, *see* Maxwell-Darling (1934).

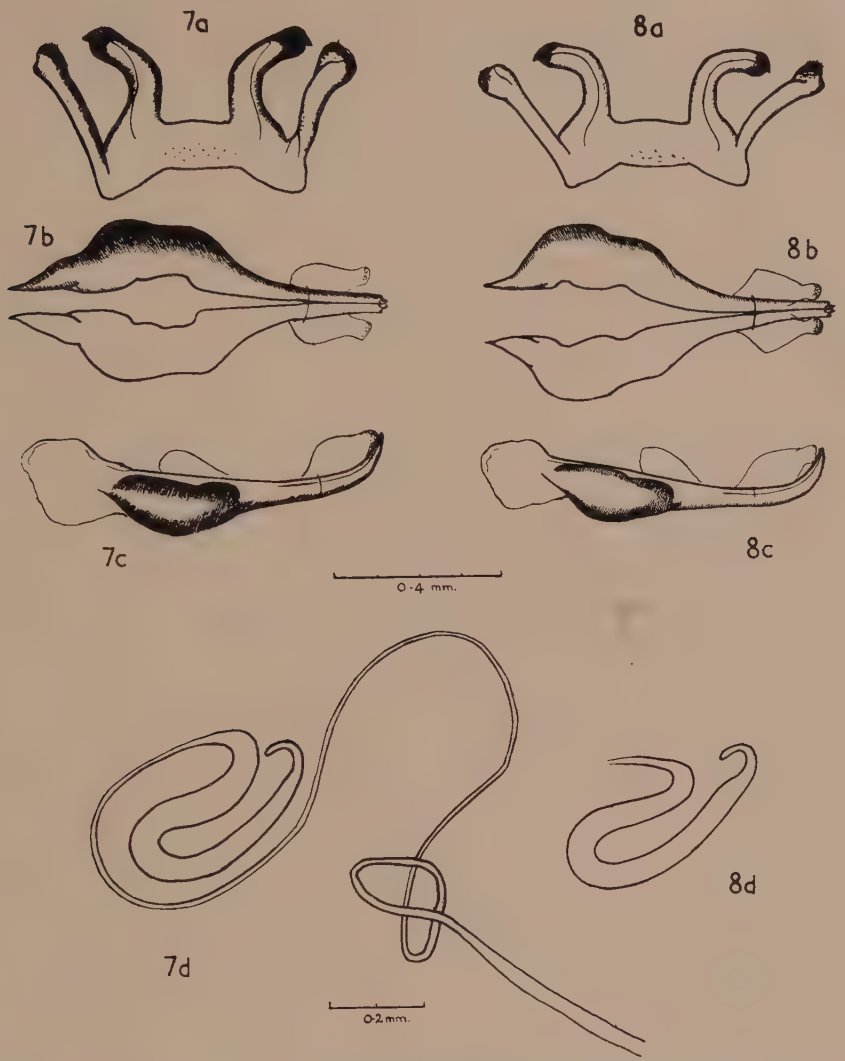
T. angustus, the exact proportions of the sternal interspaces and the hind femora vary slightly. The distinctness of the impressions of the fastigium



FIGS. 2, 2*a*, 3*a*, *b*, 4*a*, 5, 6*a*, *b*, 7*a–d*.—*Tenuitarsus sudanicus* sp. n. (Es Sidr, Sudan), 2. Sternal lamina (male); 2*a*. meso- and metasternal interspaces (female). 3*a*, *b*. Tibial spurs and tarsus: (*a*) middle leg; (*b*) hind leg. 4*a*. Hind femur. 5. Apex of abdomen (male dorsal). 6*a*. *id*. (female); 6*b*. ovipositor (lateral). 7*a–d*. Internal genitalia (male and female): (*a*) epiphallus; (*b*) aedeagus (dorsal); (*c*) *id*. (lateral); (*d*) spermatheca and duct.

verticis is also rather variable, as is the degree of rugosity of the pronotum and the length of the wings. These latter may exceed the hind femora at rest or they may be shorter than in the type.

Measurements vary within the following limits: Length of body, ♂ 10·5–11·5, ♀ 15·5–18·5; antenna, ♂ 2·8–3·0, ♀ 3·8–4·1; pronotum, ♂ 1·9–2·2, ♀ 2·8–3·2; tegmen, ♂ 8·2–10·3, ♀ 12·2–15·2; hind femur, ♂ 6·9–7·7, ♀ 10·0–11·5 mm.



FIGS. 2*b*, *c*, 3*c*, *d*, 4*b*, 8*a–d*. *Tenuitarsus angustus* (Blanch.) (Adrar, Mauritania). 2*b*. Meso- and metasternal interspaces (male); 2*c*. *id.* (female). 3*c*, *d*. Tibial spurs and tarsus: (*a*) middle leg; (*b*) hind leg. 4*b*. Hind femur. 8*a–d*. Internal genitalia (male and female): (*a*) epiphallus; (*b*) aedeagus (dorsal); (*c*) *id.* (lateral); (*d*) spermatheca.

The internal genitalia are substantially similar to those of the genus *Chrotogonus* (*see* Slifer, 1940; Roberts, 1941; Kevan, 1952), the epiphallus, aedeagus and spermatheca being illustrated at fig. 7. A comparison of the internal genitalia

with those of *T. angustus* indicated no apparent significant differences from that species.

Although the aedeagus of the three paratypes of *T. sudanicus* selected were more or less uniform in character, those of the three examples of *T. angustus* originally selected were less so since the degree of sclerotization differed appreciably. In the most heavily sclerotized specimen of *T. angustus* the aedeagus approached that indicated for *T. sudanicus* (fig. 7*b*, *c*), while the most weakly sclerotized example is illustrated at fig. 8*b*, *c*. Further dissections showed variation in sclerotization to occur in both species, but more especially in *T. angustus*, differences being apparent between individuals from the same locality ; several examples of each of the different forms of *T. angustus* were examined. Further, although the aedeagus of *T. sudanicus* tended to be slightly more robust with proportionately shorter valves, this was not found to be a reliable means of distinction, since more weakly sclerotized specimens tended to approach the form illustrated for *T. angustus*.

A comparable difficulty was found in respect of the epiphallus, which also varied in a similar manner in both species. The extreme forms of the two species are illustrated at figs. 7*a* and 8*a*. The degree of curvature of the lophi is variable in individuals of either species.

The spermathecae of three female *T. sudanicus* were also examined, and compared with six examples representing the various forms of *T. angustus*. The spermatheca in *T. sudanicus* appeared to taper slightly towards the apex and to be thicker at the second bend than in *T. angustus* (in which the organ was of more uniform diameter), but this is probably not a constant feature ; certainly any difference is too subtle to be of any value as a taxonomic character. There is also some variation in the proportionate lengths of the loops, so that the shape of the spermatheca in *T. sudanicus* may approach that illustrated for *T. angustus* and *vice versa* (*cf.* figs. 7*d* and 8*d*).

T. sudanicus may be distinguished from *T. angustus* by its slightly heavier build and especially by the shape of the sternal interspaces (*cf.* figs. 2, 2*a*, 2*b*, *c*), by its more robust hind femora (*cf.* figs. 4*a*, *b*) and by its tarsi. It should be remembered, however, that both species may vary a little in their sternal and femoral characters, although there is no difficulty in separating them on these alone. The middle tarsus in *T. angustus* has the apical segment more slender and quite distinctly longer than the other two segments together, whereas in *T. sudanicus* it is a little more robust and only very slightly longer (*cf.* figs. 3*a*, *c*) ; the hind tarsus in *T. angustus* likewise is more slender, the apical segment being approximately equal to the two others together and distinctly longer than the basal segment alone, not approximately equal to it in length (*cf.* figs. 3*b*, *d*).

The known distribution of *T. sudanicus* is shown in fig. 1. In addition to the localities listed above, the record from Northern Nigeria given by Golding (1948) almost certainly refers to this species, which is known from a relatively short distance away in French territory on the other side of L. Chad.

A certain amount of information on the ecology of the species is given by Maxwell-Darling (1934). Dr. Ebner (*in litt.*, 1951) mentions that (like *T. angustus*) it is a truly xerophilous form and does not occur in damp places, as may be the case with *Chrotogonus* which often occurs with it.

Acknowledgments.

I have to thank the following for their generous assistance by the loan of material: The Keeper of Entomology of the British Museum (Nat. Hist.), the Hope Professor of Entomology in the University of Oxford, Dr. L. Chopard of the Museum National d'Histoire Naturelle, Paris, Prof. R. Frey of the Museum Zoologicum Universitatis, Helsinki, Prof. G. Ceballos of the Instituto Español de Entomología, Madrid, Dr. R. J. V. Joyce of the Ministry of Agriculture Research Division, Wad Medani, Anglo-Egyptian Sudan, Dr. A. C. Stephen of the Royal Scottish Museum, Edinburgh, Mr. W. E. Evans of Edinburgh and Prof. R. Ebner of Vienna. I am particularly grateful also to Dr. Chopard for his kindness in comparing certain specimens with the type of *T. revoili*.

Summary.

The taxonomy of the genus *Tenuitarsus* I. Bolívar, 1904, was in an unsatisfactory state. A new species, *T. sudanicus*, is described, but in order to do this satisfactorily it was found necessary to revise the genus. The three previously known species, *T. angustus* (Blanch.), *T. revoili* I. Bol. and *T. evansi* (Uv.), are shown to be synonymous, merely representing what appear to be unstable ecological forms of a very variable species.

References.

Bey-Bienko, G. Ya., and Mishchenko, L. L., 1951, Saranchevyye Fauny S.S.S.R. i sopredel'nykh Stran. Chast'. I. [Grasshoppers of the Fauna of the U.S.S.R. and adjacent countries. Part I]. *Opred. Faun. S.S.S.R.* **38** : 378 pp.

Bodenheimer, F. S., 1935, Oekologischzoogeographische Untersuchungen über die Orthopterenfauna Palästinas. *Arch. Naturgesch.* (N.F.) **4** : 145–216.

Boyd, A. W., 1918, Six months' collecting between Ismailia and El Arish. *Bull. Soc. ent. Egypte* (1917) **10** : 98–119.

Chopard, L., 1934, Études zoologiques sur le Sahara central : Orthoptères. *Mém. Soc. Hist. nat. Afr. N.* **4** : 101–118.

——, 1948, Note sur les Orthopteroides du Sahara Marocain. *Bull. Soc. Sci. nat. Maroc.* (1945–7) **25–27** : 191–199.

Golding, F. D., 1948, The Acrididae (Orthoptera) of Nigeria. *Trans. R. ent. Soc. Lond.* **99** : 517–587.

Innes, W., Bey, 1929, Révision des Orthoptères de l'Egypte. Deuxième Partie : Acridiens. *Mém. Soc. ent. Egypte* **3** (2) : 1–176 + 7 pl.

Kevan, D. K. McE., 1951, Preliminary records of some Acridoidea (Orthoptera) from remote parts of East Africa. *Ann. Mag. nat. Hist.* (12) **4** : 713–718.

——, 1952, A study of the Genus *Chrotogonus* Audinet-Serville, 1839 (Orthopt Acrid., Pyrgomorphinae). I. The Subgenera *Obbiacris*, Nov. and *Shoacris*, Nov. *Mitt. Schweiz. ent. Ges.* **25** : 87–96.

Maxwell-Darling, R. C., 1934, The solitary phase of *Schistocerca gregaria*, Forsk., in north-eastern Kordofan (Anglo-Egyptian Sudan). *Bull. ent. Res.* **25** : 63–83 + 2 pl.

Morales Agacino, A., 1945, Algunos datos sobre Ortopteroides del Sáhara occidental. *Eos, Madr.* **20** : 309–339 + 1 pl.

——, 1947, Notas sobre Ortopteroides de Ifni y Sahara Español. *Ibid.* **23** : 241–283.

Rehn, J. A. G., 1913, Records of Egyptian Orthoptera with the description of one new species. *Bull. Soc. ent. Egypte* (1912) **5** : 43–52.

Roberts, H. R., 1941, A comparative study of the subfamilies of the Acrididae (Orthoptera) primarily on the basis of their phallic structures. *Proc. Acad. nat. Sci. Phil.* **93** : 201–246.

Savigny, J. C., 1825 ?, *Histoire Naturelle :* Zoologie, Orthoptères, *in* France, Commission d'Egypte, 1809–30, *Description de L'Egypte, ou Recueil des Observations et les Recherches qui ont été faites en Egypte pendant l'Expedition de L'Armée française.* Paris. Atlas, **10** : pls. 1–7 [designed and engraved 1805–1812, seemingly for publication 1809–1813 but apparently not issued until 1822 or 1825].

Schulthess-Schindler, A. de, 1898, Orthoptères du Pays des Somalis, recueillis par L. Robecchi-Brichetti en 1891 et par le Prince E. Ruspoli en 1892–93. *Ann. Mus. Stor. nat. Genova* (2) **19** : 161–216 + 2 pl.

Slifer, E. H., 1940, The internal genitalia of female Thrinchinae, Batrachotetriginae, Pamphaginae and Pyrgomorphinae (Orthoptera, Acrididae). *J. Morph.* **66** : 175–185 + 5 pl.

Uvarov, B. P., 1921, A contribution to our knowledge of the Orthoptera Acridiodea of Mesopotamia and N.W. Persia. *J. Bombay nat. Hist. Soc.* **27** : 803–812.

——, 1924, Some new and interesting Orthoptera in the collection of the Ministry of Agriculture, Cairo. *Bull. Min. Agric. Egypt* **41** : i–iv, 1–41, + 3 pl.

——, 1933, Orthoptera collected by Mr. Bertram Thomas in Southern Arabia. *Proc. zool. Soc. Lond.* **1933** : 259–271.

——, 1949, Tettigoniidae and Acrididae from Persia, collected in 1936–37 by Fred Brandt. *Notul. ent., Helsingf.* **28** : 89–91.

—— and Tewfik, M., 1938, A list of Orthoptera from South Arabia. *Bull. Soc. ent. Egypte* (1937) **21** : 271–283.

—— and Volkonsky, M. A., 1939, Notes on a desert Grasshopper with digging habits, *Eremogryllus hammadae* Krauss, 1902 (Orthoptera : Acrididae). *Proc. R. ent. Soc. Lond.* (A) **14** : 19–23.

Book Notice.

A Textbook of Arthropod Anatomy. By R. E. Snodgrass. 8vo. London (Constable & Co.), 1952. Pp. viii + 363, text illust. Price 48*s.*

This work has arisen from an investigation undertaken by the author, himself a leading entomologist, with the object of evaluating the various theories of insect origin and descent by exploring the fields of other specialists.

While it was not possible to draw any final conclusions from the investigations, the information collected on the comparative anatomy of arthropods has been brought together in the present work.

The subject is dealt with under the following headings : I. The Trilobata. II. Limulus. III. The Eurypterida. IV. The Pycnogonida. V. The Arachnida. VI. The Crustacea. VII. The Chilopoda. VIII. The Diplopoda. IX. The Pauropoda. X. The Symphyla. XI. The Hexapoda.

An extensive bibliography and index are included at the end of the volume.

HYDRODESSUS GEN. N. *HYDROPORINARUM* (COLEOPTERA, DYTISCIDAE).

By J. Balfour-Browne, M.A., F.R.E.S.

I am indebted to Dr. Harald Sioli of the Instituto Agronomico do Norte, Belem, Para, Brazil, for the representatives of this new genus, collected during his Limnological Exploration of the Amazon.

Hydrodessus gen n.

Elongate, pronotum with the sides very finely margined, without lateral striae, base only very feebly produced in the middle, almost straight; scutellum entirely concealed;

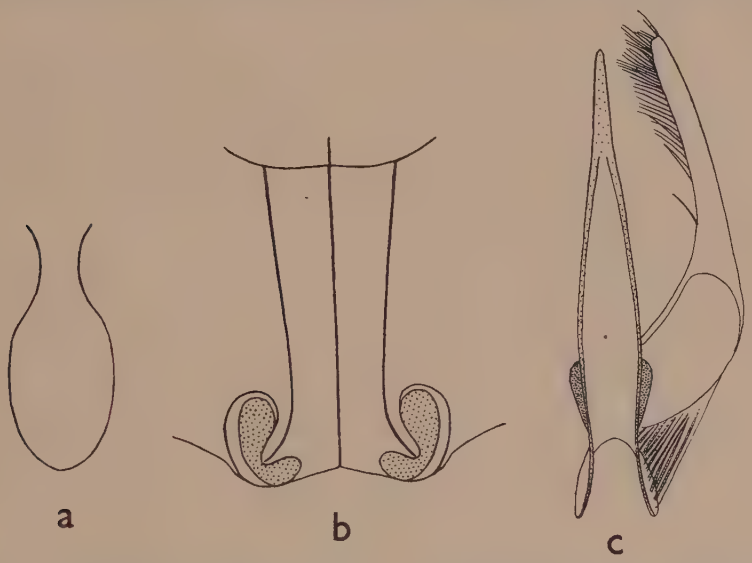


Fig. 1.—*Hydrodessus siolii* gen. n., sp. n. (*a*) Prosternal process. (*b*) Metacoxal processes. (*c*) Aedeagus and paramere, from below.

elytra oval, forming a distinct angle with the base of the pronotum, without plicae; intercoxal process of the prosternum feebly concave, without trace of transverse grooves or a distinctly delimited base to the prosternal process; prosternal process spatuliform, with the median portion shallowly impressed, without lateral borders; mesocoxal cavities contiguous, the intercoxal process of the metasternum very narrow; coxal lines anteriorly weakly divergent; post-coxal laminae extending well beyond a line drawn between the apex of the coxal lobes, the coxal cavities thus with a distinct coxal excision; third segment of the anterior and intermediate tarsi weakly bilobate, not quite concealing the short fourth segment; claws of the posterior tarsi straight, unequal, the internal one longer and slightly stouter than the external one; aedeagus trilobate, the median lobe simple, the parameres slender, elongate and furnished internally towards the apex with a tuft of fine hairs, the apex not terminally hooked.

Type species : *Hydrodessus siolii* sp. n.

This genus is interesting owing to the unusual form of the aedeagal parameres in a member of the Hydroporinae. It is noteworthy that these are of a form normally met with in the Colymbetinae, but which appears also in a primitive form in the Celinae. The genus is, however, indisputably Hydroporine by the structure of the prosternum with the process lying in a different plane from the prosternum itself ; the pseudo-tetramerous anterior and intermediate tarsi are also an Hydroporine feature. The relationships of the new genus are not apparent ; the aspect is distinctly Bidessine, but the basal ventrite of the abdomen does not appear to be completely soldered to the metacoxae and the posterior tibiae are straight. It would, however, appear best to treat the new genus as an abnormal member of the Bidessini until additional material is available for a more complete anatomical study.

Hydrodessus siolii sp. n.

Derm flavous, the elytra with the suture narrowly, and with transverse basal, median and sub-apical bands, black ; finely, punctate and clothed with short flavous hairs.

Head flavous, sub-nitid, with a fine, rather obsolescent reticulation of small rounded areolae ; finely, not densely punctate, the punctures about the size of an eye-facet and separated by a distance between two and three times the diameter of the punctures ; the punctures very much finer anteriorly. *Pronotum* transverse, the sides rounded, finely margined, the posterior angles obtuse ; sub-nitid with an obsolete microreticulation of rather transverse areolae ; punctulate, more finely and sparsely anteriorly, more closely and more strongly posteriorly, the punctures posteriorly separated by a distance scarcely as great as the average diameter of a puncture ; the base only very weakly obtusely produced in the middle. *Scutellum* entirely concealed. *Elytra* elongate-oval, attenuate to the rather sharply rounded apex, which is minutely produced at the suture ; sub-nitid, with a very fine reticulation of rather transverse scratches which form distinct areolae visible only under a magnification of about 100 ×, the areolae more evidently transverse in the posterior half ; flavous, the suture narrowly and with basal, median and sub-apical bands, black, the transverse bands variably dilated antero-posteriorly on the disc, and in some cases joined together by this enlargement to isolate three flavous maculae on the sutural side, the transverse black bands not attaining the side margin ; moderately finely but not closely punctate, the punctures smaller than those at the base of the pronotum and on the average separated by nearly three times their own diameter, the longitudinal systematic series not separable from the general punctation ; the sides of the elytra at the base forming a distinct wide angle with the sides of the pronotum when seen from above. *Venter* entirely flavous ; prosternal process spatulate and feebly excavated in the middle, unmargined ; metasternal wings linear ; post-coxae and basal ventrites rather coarsely and moderately closely punctate, the punctures slightly excentric, punctural interstices smooth and shining ; apical ventrite conical, the apex sharply rounded. *Legs* flavous, the third segment of the anterior and intermediate tarsi weakly bilobate, the fourth segment small, not extending beyond the lobes of the third segment, claws slender ; claws of the posterior tarsi straight, unequal, the internal one longer. *Sexual dimorphism :* the reticulation of the dorsum is more distinct in the female, this sex therefore less shining ; the basal segments of the anterior and intermediate tarsi of the male very little broader than in the female.

Holotype ♂, Brazil : Para ; Rio Cupari, Igarapé Ingatuba, 22.x.1948, "margem esquedra, entre detrito fibrosito" (Harald Sioli leg.). 3·069 × 1·436 mm.

Paratypes, 1 ♂, 2 ♀, with the type, 2·970 × 1·386. mm.

A NEW SPECIES OF *RHAMPHOMYIA* MEIGEN (DIPTERA : EMPIDIDAE) FROM MOROCCO.

By J. E. Collin, F.R.E.S.

Only three species of *Rhamphomyia* appear to have been described from Africa, viz., *R. tenuipes* Becker (1907) from Algiers, a species of the subgenus *Holoclera*, the type of which I have seen, *R. empidiformis* Becker (1910) from Southern Ethiopia, a small (3 mm.) species very inadequately described from a single female, and *R. rhodesiensis* Collin, very distinct in having the abbreviated discal vein of a *Coptophlebia*. The species now described is interesting not only because it is the first to have been found in Morocco, but also for the reason that, while superficially resembling species of the *chionoptera-crinita* group (subg. *Alpinomyia* of Frey), it possesses some of the distinguishing features of his subgen. *Eorhamphomyia*, in which Frey places such species as *stigmosa* and *laevipes*. The male genitalia, while distinctive, appear to conform more to the pattern in *Eorhamphomyia* than to that in *Alpinomyia*. At any rate the species belongs to that section of *Rhamphomyia* in which these two not very well distinguished subgenera are included.

Rhamphomyia maroccana sp. n.

A rather small blackish species, uniformly dusted greyish,[1] with hair-like biserial acrostichals, bi-tri-serial dorsocentrals, a few bristly hairs on prothoracic episterna and upper side corners of prosternum, six scutellar bristles, and anal vein distinct for whole length. Male with distinctive leg bristles and genitalia. Female with legs quite short-haired.

♂. Eyes touching on frons, with upper facets more enlarged than lower. First antennal joint about one and one-half times length of second, third joint lanceolate, about one and one-half times length of first two together, with a short stout apical style. Labrum scarcely longer than head is high, labium and labellae long haired. Palpi greyish-black with long fine dark hairs below.

Thorax with indications of three narrow dark lines down rows of hairs (middle one less distinct). The hairs of these rows rather long but quite fine, acrostichal rows very close together; other still longer hairs outside the dorsocentral rows and more numerous in front. Even the 2–3 stronger posterior dorsocentrals and the usual stronger bristles at sides of thorax by no means spinose. Scutellum with about six marginal bristles, basal pair shortest. Hairs and bristles on whole insect (including those on squamae) blackish.

Abdomen rather exceptionally long haired, especially at sides and on hind margins, but shorter on last three segments. Hind marginal bristles by no means strong. Belly grey like disc but hairs finer and less numerous except on hind margins of sternites, where they may exceed length of sternites. Hypopygium (fig. 1, outline only) with quite short hairs on upper lamellae, but some long ones on side lamellae with a loose cluster of rather shorter curved hairs at lower outer tip. Penis stout at base but *not* clubbed at tip as in the *crinita*-group. Ventral lamella (genital sternite) at base of penis of distinctive shape in plan (fig. 1c), and upper lamellae seen from above (fig. 1b) bearing short dense greyish pile on inner surface with some tiny black spines intermixed towards the end.

[1] Allowance must be made throughout the description for the fact that the specimens were originally preserved in spirit.

Legs with femora by no means bristly, but with antero- and posteroventral rows of longish quite fine hairs on four anterior femora, and an anteroventral row only of shorter hairs, with a mixture of 2–3 longer rather more bristly hairs on middle third of hind femora. All tibiae with long hairs mixed with strong bristles above, but only on middle tibiae beneath; front tibiae very shortly pilose beneath, hind tibiae with comparatively short hairs and 2–3 short bristles beneath and a bristle in " comb " at tip behind. All tarsi with conspicuous hairs above, longest on front tarsi, and each of first four joints of all tarsi with 4–5 longer and stronger bristles (especially on four anterior tarsi) round tip except beneath. No basal joint dilated, and only those of four posterior legs with (very inconspicuous) spines beneath.

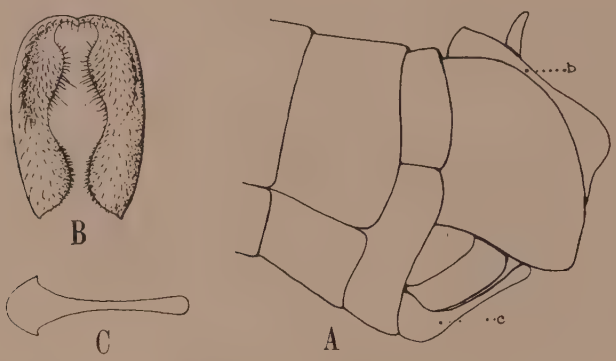


Fig. 1.—*Rhamphomyia maroccana* sp. n., ♂. A. Outline of end of abdomen, with (*b*) upper lamella and (*c*) ventral lamella. B. Upper lamellae, dorsal view. C. Ventral lamella, ventral view.

Wings only greyish, with all veins, including anal vein, distinct, and a dark " stigma " below the thickened end of subcostal vein (sometimes known as r^1). Axillary excision acute. Halteres yellow.

♀. Much shorter haired everywhere than in male. Frons as wide as face and with only two hairs on each side in front. Face very little longer than wide. Abdomen conspicuously hairy above, but hairs shorter towards tip and hind marginal hairs not more conspicuous. Belly universally very short haired. Anal papillae long, slender and short haired. All hairs and bristles on legs particularly short, longer only on coxae. Hind femora with some short, outstanding fine hairs *behind* only. Middle femora with an anteroventral spaced row of tiny bristles and a posteroventral row of only slightly longer ones. Tibial bristles very small, longest above hind tibiae, which, however, have none beneath. Tarsal hairs and bristles very inconspicuous, but basal joint of all tarsi indistinctly spinose beneath. Wings rather browner than in male.

Length about 4 mm. without antennae.

Holotype ♂, paratype ♀, Morocco: Ifranc, 19.xii.51 (*Davies*). In British Museum (Natural History).

A NEW NYCTERIBIID (DIPTERA) FROM NIGERIA.

By H. Oldroyd, M.A., F.R.E.S.

Four Nycteribiidae, two males and two females, from an unidentified species of bat, were sent to me in June 1949 by Mr. P. I. M. Maclaren, of the Fisheries Station, Lagos, Nigeria. These flies have eyes with two facets, and tibiae with two rings, a combination different from that of any accepted genus. In *Cyclopodia* the eyes have two facets and the tibiae three rings, while in *Eucamp-*

Figs. 1–5.—*Cyclopodia biannulata* sp. n.: (1) abdomen of ♂, ventral view; (2) *ditto*, dorsal view; (3) abdomen of ♀, ventral view; (4) *ditto*, dorsal view; (5) fore leg of ♂.

sipoda there are two tibial rings and only single facets in the eyes. At first I considered erecting a new genus for this new species, but in general it is so like *Cyclopodia* that I cannot think that such a step would be justified, at any rate on the available material.

Cyclopodia biannulata sp. n.

Head broad, not laterally compressed, with two facets in each eye. Tibiae with two white rings (fig. 5). Fore coxae elongate. Fourth sternite of male with a comb of about 22 very blunt spines. Halteres small, with stalk and round knob. Pleura with one large bristle and one very much smaller.

Proc. R. Ent. Soc. Lond. (B) 22. pts. 3–4. (April 1953).

Abdominal Structure :

♂ *Dorsally* (fig. 2) : with six visible segments, of which the sixth is nearly half the total length of the abdomen. Bristles evenly distributed along margins ; membrane at base of first tergite with eight bristles, in two symmetrical groups of four.

Ventrally (fig. 1) : with five visible segments. Comb on first segment has about 40 spines. Fourth segment bowl-shaped in outline, with a posterior comb of about 22 very blunt spines, and with long bristles on rest of margin, but with hardly any discal bristles. Claspers extending far forwards, with their tips beneath fourth sternite.

♀ *Dorsally* (fig. 4) : with two sclerotised segments only. The first tergite near the base has two groups of short bristles, as in male, otherwise with only marginal bristles. Anal segment oval, bare except for a posterior fringe of very strong bristles. Rest of chaetotaxy as in figure, bristles short, and uniformly distributed, except for a cluster of very strong ones in middle, anterior to anal plate.

Ventrally (fig. 3) : First segment with a comb of about 40 spines. Anal segment bifid, with long, stout bristles. Rest of abdomen membranous, with the chaetotaxy shown in the figure. Most of bristles small, but there are isolated long ones in clearly defined and symmetrical positions.

Length of body ♂ 2·8 mm. ; ♀ 2·8 mm.

Holotype in British Museum (Natural History). Holotype ♂, 1 ♂ and 2 ♀ paratypes, Nigeria : Ondo, from an unidentified bat (*R. I. M. Maclaren*).

Book Notice.

Common Names of British Insect and Other Pests. Part 2 : Lice, Thrips, Plant Bugs, Aphids and Scale Insects, Butterflies and Moths, Fleas, Mites and Ticks. 8vo. Harpenden (Miss B. M. Stokes, Entomology Department, Rothamsted Experimental Station), 1952. Pp. 40. Price 3*s*.

This follows the pattern of Part 1 which appeared in 1947, and dealt with slugs and snails, eelworms, beetles, flies and sawflies, wasps and related insects. General agreement on common names was arrived at by the Conference of Advisory Entomologists and the Pests and Diseases Committee of the Association of Applied Biologists. The *Check-List of British Insects* by Kloet and Hincks has been followed so far as possible.

The work is clearly printed in double column, giving the scientific names alphabetically under the various Orders with the common names opposite. A second list gives the common names alphabetically, with their corresponding scientific names.

As the International Rules of Zoological Nomenclature make the names constantly liable to revision it is hoped to keep the scientific names up to date by publishing revised lists from time to time.

SOME NEW DIASPINE SCALE INSECTS FROM INDIA.

By V. Prabhaker Rao, M.A., D.Sc.

(Assistant Director (Foreign Quarantines), Directorate of Plant Protection, Quarantine and Storage, Ministry of Food and Agriculture (Government of India), New Delhi, India.)

Introduction.

During a short stay in London a few years ago, while attempting to identify scale insects in his collection by comparing them with those from India in the Green collection deposited in the British Museum (Natural History), the author came across a number of species in the latter which are new to science but which have so far been known only under their manuscript names. Four of these insects had been collected by Dr. T. V. Ramakrishna Ayyar in South India and two by Mr. T. B. Fletcher in North India. The former have been mentioned by Dr. Ayyar (1930) in his *Contribution to our Knowledge of South Indian Coccidae (Scales and Mealy Bugs)* and the latter by Misra (1923) in his *List of Coccidae in the Pusa Collection* under manuscript names, but their actual descriptions have not so far been published. The author, therefore, considers it worth while describing them. He is deeply indebted to the Trustees of the British Museum and to the Assistant Keeper, Mr. F. Laing, for facilities for examining the slides of scale insects available there and for permitting him to describe the species mentioned in this paper. The author is also grateful to Dr. Harold Morrison of the U.S. Department of Agriculture and to Dr. W. J. Hall, Director, Commonwealth Institute of Entomology, London, for kindly going through this paper and suggesting valuable improvements.

Chionaspis pusa sp. n. (fig. 1, *a–e*).

Scale of female: White in colour with the first pellicle pale yellow and the second pellicle light orange with a whitish wax secretion on the top.

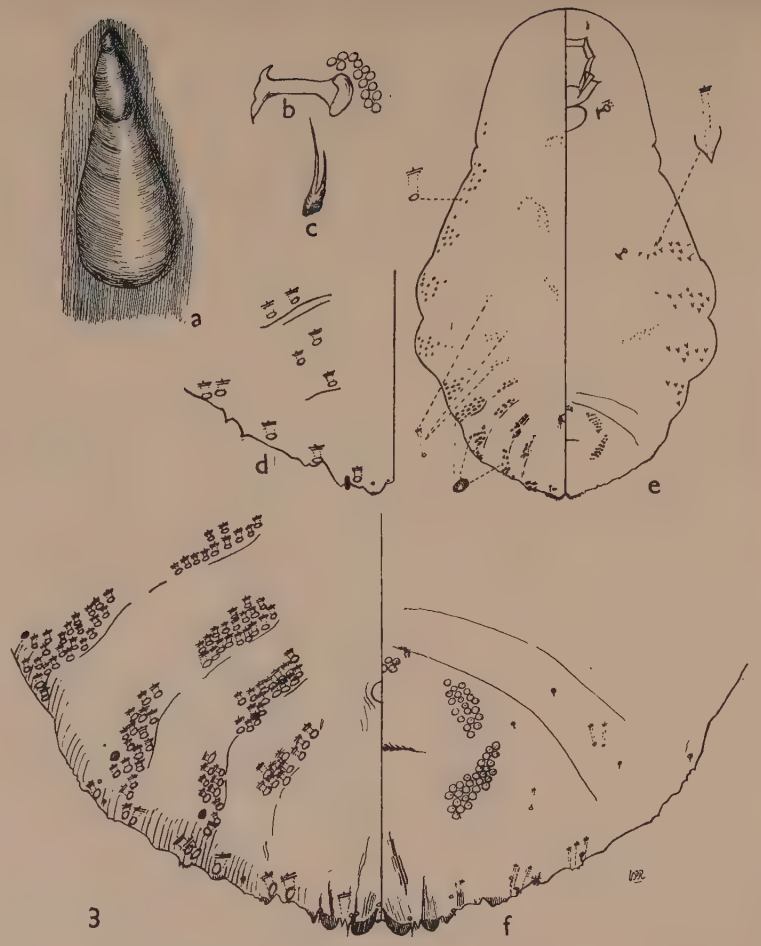
Female elliptical (fig. *d*). Antennal tubercle with a papilla-like projection and a longer seta (fig. *b*). Anterior spiracle with a group of parastigmatic pores (fig. *c*), posterior spiracles without. Prosoma and the free abdominal segments dorsally on the margin with a group of ducts. Submarginal and submedian dorsal ducts present in second, third, fourth and fifth segments of abdomen. Ventral gland spines present in the marginal region of the free abdominal segments (fig. *d*). Circumgenital pores in five groups. Pygidium with three pairs of distinct lobes; median lobes large, meeting at the base, with both inner and outer margins notched; second lobe duplex, inner lobule elongated, outer lobule tooth-like; third lobe also duplex, inner lobule much longer than outer. Margin of pygidium dentate in two regions beyond the third lobe. Pygidial margin with a single gland spine between median and second lobes, a single gland spine between the second and third lobes, two gland spines on the outer side of third lobe and three between the two indented regions of the pygidial margin.

Hosts and distribution: This insect was collected from leaves and stems of citrus by T. B. Fletcher at Pusa, India.

Type series mounted on slides in the Green collection deposited in the British Museum (Natural History).

Fig. 1.—*Chionaspis pusa* sp. n. (*a*) Female scale. (*b*) Antenna of female. (*c*) Anterior spiracle of female. (*d*) Dorsal and ventral views of female. (*e*) Dorsal and ventral views of pygidium.

Fig. 2.—*Chionaspis ramakrishnai* sp. n. (*a*) Anterior spiracle of female. (*b*) Antenna of female. (*c*) Pygidial margin of female showing the lobes. (*d*) Dorsal and ventral views of female. (*e*) Dorsal and ventral views of pygidium.



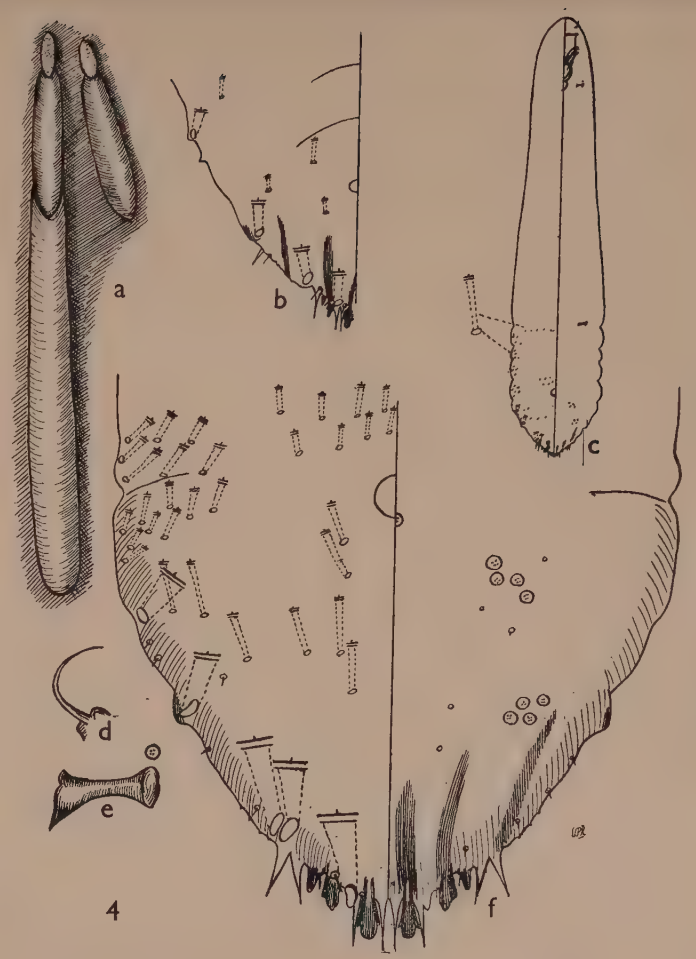


FIG. 3.—*Dentachionaspis centripetalis* sp. n. (*a*) Female scale. (*b*) Anterior spiracle of female. (*c*) Antenna of female. (*d*) Dorsal view of pygidial portion of second stage female. (*e*) Dorsal and ventral views of female. (*f*) Dorsal and ventral views of pygidium of female.

FIG. 4.—*Kuwanaspis longissima* sp. n. (*a*) Female and male scales. (*b*) Dorsal view of pygidial portion of second-stage female. (*c*) Dorsal and ventral views of female. (*d*) Antenna of female. (*e*) Anterior spiracle of female. (*f*) Dorsal and ventral views of pygidium.

Misra (1923 : 348) mentions this species as *Chionaspis pusa* in his list.

Systematic position : It would require a review of the whole group of species referred to the genus *Chionaspis* to determine exactly the generic position of *Chionaspis pusa* and the species *C. ramakrishnai* described below. They are, however, provisionally described here under *Chionaspis*, as originally placed by Green.

Chionaspis ramakrishnai sp. n. (fig. 2, *a–e*).

Scale of female : Not seen.

Female elliptical, broadest at the first and second abdominal segments (fig. *a*). Antennal tubercle with a papilla and an elongated spine (fig. *b*). Anterior spiracle with a large group of parastigmatic pores ; posterior spiracle with only about four parastigmatic pores. Prosoma and free abdominal segments with group of ducts in the dorsal marginal region. Free abdominal segments also with ventral gland spines in the margin. Dorsal submarginal and submedian ducts present in fourth, fifth and sixth segments. Pygidium with four pairs of lobes ; median lobe largest, second and third smaller, while fourth only slightly indicated. A club-shaped median zygosis projects inside from the median region, in between the base of the median lobes (fig. *e*). Pygidial margin with a single gland spine between the median and first lateral lobes on either side, two between the second and third lobes, two between the third and fourth, three beyond the fourth, and a group of five or six at the base of the pygidium.

Hosts and distribution : This species was originally collected by Ramakrishna Ayyar at Coonoor in Nilgiris, Madras State, India, on *Eugenia calophyllifolia*, and has been mentioned by him (1930 : 19) under the manuscript name of *Pinnaspis ramakrishnae.*

Type series mounted on slides in the Green collection deposited in the British Museum (Natural History).

Systematic position : This species resembles *Chionaspis americana* Johnson in possessing a median zygosis at the base of the median lobes, although in *ramakrishnai* it is more prominent and stalked.

Dentachionaspis centripetalis sp. n. (fig. 3, *a–f*).

Scale of female : White, first pellicle being pale yellow with darker markings and the second pellicle reddish brown. Length about 3 mm. and greatest width about 1·5 mm.

Scale of male : Not seen.

Female : Nearly oval, narrow anteriorly, broadest in the region of the first and second abdominal segments. Antennal tubercle with two long setae, one longer than the other. Anterior spiracle with a number of stigmatic pores, posterior spiracle without. Margin of the prosoma, metanotum, as well as the first three abdominal segments, with a group of dorsal ducts in the margin. Several submarginal ducts in the third, fourth and fifth segments. Several submedian ducts in the third, fourth, fifth and sixth segments. Three rows of submedian dorsal microducts present in the first three abdominal segments. Anal opening near the base of the pygidium. Genital opening posterior to the anal opening. Circumgenital pores in five groups. Median lobes rounded at the apex, and tapering adjacent at the base but not yoked ; second lobe duplex, inner lobule rounded, outer tooth-like, third lobe indicated by two small chitinised projections. A single gland spine between the median and the second lobe ; an elliptical to circular chitinised area in each of the third, fourth and fifth segments near the group of submarginal ducts (figs. *e* and *f*).

Type series mounted on slides in the Green collection deposited in the British Museum (Natural History).

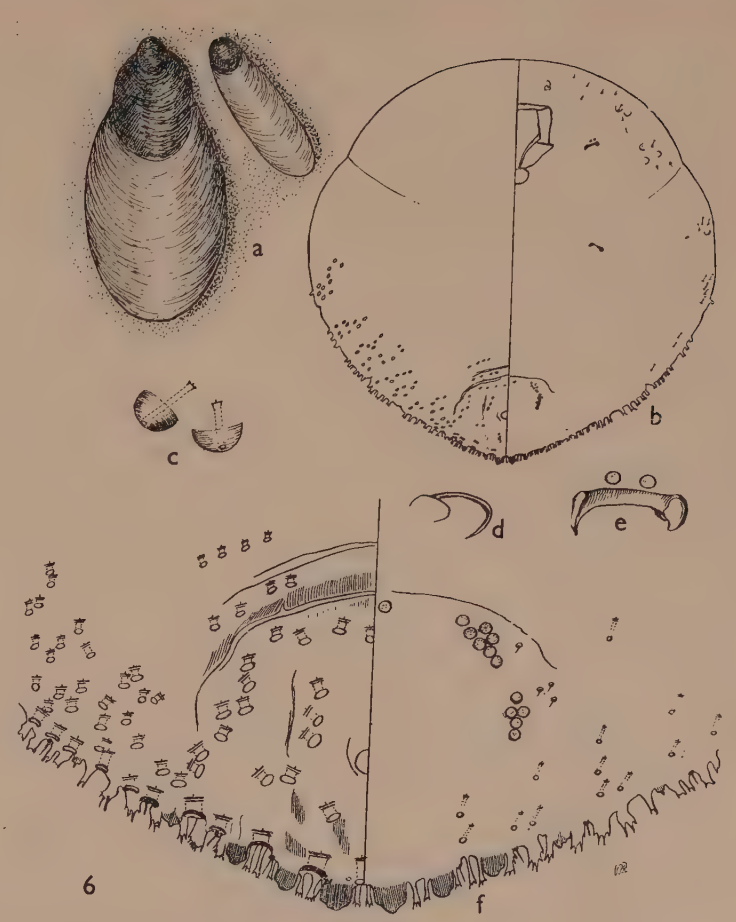


FIG. 5.—*Ramachandraspis fenestrata* sp. n. (*a*) Dorsal view of pygidial portion of second stage female. (*b*) Dorsal and ventral views of female. (*c*) Antenna of female. (*d*) Dorsal and ventral views of pygidium. (*e*) Anterior spiracle of female.

FIG. 6.—*Parlatoria orientalis* sp. n. (*a*) Female and male scales. (*b*) Dorsal and ventral views of female. (*c*) Ventral duct tubercles. (*d*) Antenna of female. (*e*) Anterior spiracle of female. (*f*) Dorsal and ventral views of pygidium.

Hosts and distribution : This species was originally collected on apple, in Kashmir, by T. B. Fletcher in 1916, and has remained undescribed so far, although Misra (1923 : 348) mentioned it under the *nomen nudum Chionaspis centripetalis* Green.

Systematic position : This species resembles *D.. pseudonivea* (Malenotti), but can be separated from it by the large number of submedian and submarginal dorsal ducts on the pygidium.

Kuwanaspis longissima sp. n. (fig. 4, *a–f*).

Scale of female : Very elongated, slender, sides nearly parallel, straight or curved, yellowish brown in colour ; length about 3 to 4 mm., width about 0·25 mm.

Scale of male : Similar to that of female, but considerably smaller.

Female : Very slender, delicate, not highly chitinised ; sides nearly parallel, anterior portion being very slightly narrower (fig. *c*). Antennal tubercle with a single seta (fig. *d*). Anterior spiracle with a single parastigmatic pore (fig. *c*), posterior spiracle without. Free abdominal segments with ducts in dorsal marginal region. A longitudinal row of similar dorsal ducts present in the anterior region of first abdominal segment (fig. *c*) and two rows of about four ducts each just anterior to the anal opening (figs. *c* and *f*). Pygidium with two pairs of lobes ; median lobes largest with a single notch on each side, margin rounded apically; second lobe divided into two lobules, the inner larger with single notch on outer side, the outer lobule tooth-like. Two gland spines between the median lobes, a single spine on the outer side of median lobe and two spines on the outer side of the tooth-like second lobule. Margin anterior to the last named gland spines toothed. Pygidium with five large marginal ducts on each half. Circumgenital pores in five groups, the median group usually being represented by a single pore (fig. *f*).

Type slide in the Green collection deposited in the British Museum (Natural History).

Hosts and distribution : This species was collected originally by Dr. T. V. Ramakrishna Ayyar on *Bambusa* sp. at Dhoney valley, North Malabar, Madras State, India, and has been mentioned by him (1930 : 16) under the manuscript name of *Chionaspis longissima* Green.

Systematic position : This species is allied to the Indian species *Chionaspis annandalei* Green, but can be distinguished from it by the presence of circumgenital pores. The gland spines in *Kuwanaspis longissima* are longer than the median lobes, while in *C. annandalei* they are shorter. It may also be stated here that *C. annandalei* should be transferred to the genus *Kuwanaspis*. *K. longissima* also resembles *Chionaspis linearis* Green, but can be separated from it by the shape of the median lobes and the inner lobule of the second lobe of the pygidium.

On account of the very peculiar pygidial characteristics of the following species, a new genus, *Ramachandraspis*, has been erected for its reception.

Ramachandraspis gen. n.

Diaspididae, referable to the tribe Diaspidini of the subfamily Diaspidinae. Body ovate. Pygidium without marginal ducts, lobes or plates ; margin dorsally with closely arranged groups of circular to elliptical thick-rimmed pores ; with irregular network like sculpturing in the centre of the pygidium posterior to the anal opening ; dorsal ducts numerous, irregularly arranged. Circumgenital pores present in five groups.

Type species : *Ramachandraspis fenestrata* sp. n.

Ramachandraspis fenestrata sp. n. (fig. 5, *a–e*).

Scale of female : Not seen.

Scale of male : Not seen.

Female : Ovate in shape, broader anteriorly (fig. *b*). Pygidium without marginal ducts, lobes or plates ; dorsal margin with five closely arranged groups of circular to elliptical thick-rimmed pores having irregular slit-like openings ; at the margin the groups are separated in each case by a single fine seta ; the most anterior group of these pores is the smallest ; an irregular network-like sculpturing present dorsally just anterior to the pore groups and posterior to the anal opening. Dorsal ducts on pygidium numerous, irregularly arranged. Similar ducts although more elongated also present along the marginal region of the body on the dorsum and smaller ones on the ventrum. Anal opening with its rim slightly more chitinised. Circumgenital pores in five groups. Numerous minute elongated ducts present on ventrum of pygidium (fig. *d*). Antenna minute, with three setae (fig. *c*). Anterior spiracle with about five parastigmatic pores (fig. *e*) ; posterior spiracle without.

Second stage pellicle with pygidial margin with four groups of circular to elliptical thick-rimmed pores similar to those present in the adult female, four marginal setae and four submarginal setae on pygidium. No distinct lobes, these being indicated only by a slight tooth-like projection between the most posterior pairs of setae and a similar one between the most anterior pairs of setae in the pygidial margin. Dorsum of pygidium with numerous dorsal ducts.

Type series mounted on slides in the Green collection deposited in the British Museum (Natural History).

Host and distribution : This species was originally collected by T. V. Ramakrishna Ayyar on *Elaeocarpus* sp. at Coonoor, Nilgiris, at a height of 6000 ft. and has been mentioned by him (1930 : 20) under the manuscript name of *Fiorinia fenestrata*.

Parlatoria orientalis sp. n. (fig. 6, *a–f*).

Female scale : Dirty-white ; first and second pellicle dark to black in colour, with whitish wax secretion on top. Length about 1·5 to 1·75 mm. ; width about 0·75 mm. (fig. *a*).

Male scale : White ; pellicle brownish yellow. Length about 0·75 mm. (fig. *a*).

Female : Almost circular, with a notch on each side anteriorly between the prosoma and the rest of the body (fig. *b*). Antennal tubercle with a single seta (fig. *d*). Anterior spiracle with two parastigmatic pores (fig. *e*) ; posterior spiracle without. Pygidium with five pairs of lobes ; median lobe the largest with a notch on each side ; second smaller with a single notch on the outer side ; third lobe smaller than second ; all rounded apically ; fourth lobe smaller than third, sometimes slightly dentate, otherwise projecting to a point ; fifth lobe similar to the fourth, but smaller and with more pointed apex. The two plates between median lobes and between the median and second lobes narrow and apically fimbriate. Three plates between second and third lobes also narrow and fimbriate. Plates on the pygidial margin beyond the third lobes broader. Anal opening small. Circumgenital pores in five groups (fig. *f*). Ventral duct tubercles few, prespiracular two, anterior spiracular three, intermediate single (fig. *b*). Anterior spiracle with two parastigmatic pores. Derm pocket between posterior spiracle and body margin not seen in specimen examined. Numerous ducts present ventrally on pygidium.

Type slide in the Green collection deposited in the British Museum.

Hosts and distribution : This species was collected by Ramakrishna Ayyar in 1909 on a wild bush at Coimbatore in South India, and has been mentioned

by him (1930 : 31) under the name of *Parlatoria* (*Euparlatoria*) *orientalis* Newstead MS.

Systematic position : This species is allied to *Parlatoria morrisoni* McKenzie, but can be separated from it by the larger number of dorsal ducts on the pygidium, five groups of circumgenital pores, the better defined fourth and fifth lobes, and the presence of a group of four submedian dorsal ducts in the two abdominal segments immediately in front of the pygidium.

References.

Ramakrishna Ayyar, T. V., 1930, *Bull. agric. Res. Inst. Pusa*, **197** (1929).
Misra, C. S., 1923, *Proc. ent. Mtgs. Pusa* **5** : 345–351.

Book Notices.

The Heleidae of California. By Willis W. Wirth. *University of California Publications in Entomology* **9** (2): 95–266, text illust. (In England, Cambridge University Press), 1952. Price $2.00.

Until the publication of the present paper the Heleidae of Western North America have been comparatively neglected.

The economic importance of the family is briefly reviewed, collecting and preservation methods outlined, and morphological details given in the first ten pages.

The family is then divided into four sub-families and the genera and species dealt with systematically under each. This is followed by a key to, and descriptions of, the immature stages of the family.

A very full bibliography and appendix complete the work.

Die Schmetterlinge Mitteleuropas. By W. Forster and T. A. Wohlfahrt. Bd. I/II, Lfg. 2. Bd. I, pp. 33–64, Bd. II, pp. 33–64, 4 pls. (col.). 4to. Stuttgart (Franckh'sche Verlagshandlung), 1952. Price DM.10 per Lieferung.

As in the case of Lieferung 1, the second Lieferung of this work comprises 32 pages of each of Volumes I and II, Volume I dealing with the general subject, and Volume II treating the diurnal Lepidoptera systematically. Four coloured plates illustrate this section of the second volume.

TWO NEW SPECIES OF PSYCHODIDAE (DIPTERA, NEMATOCERA) FROM BRITAIN.

By Paul Freeman, M.Sc., F.R.E.S.
(*British Museum, Natural History.*)

Since the publication of keys to the British species of Psychodidae in *Handbooks for the Identification of British Insects* **9** (2) : 77–96, series of the following two new species have been presented to the British Museum (Nat. Hist.). I take pleasure in naming them after their collectors Messrs. G. Crisp and B. R. Laurence.

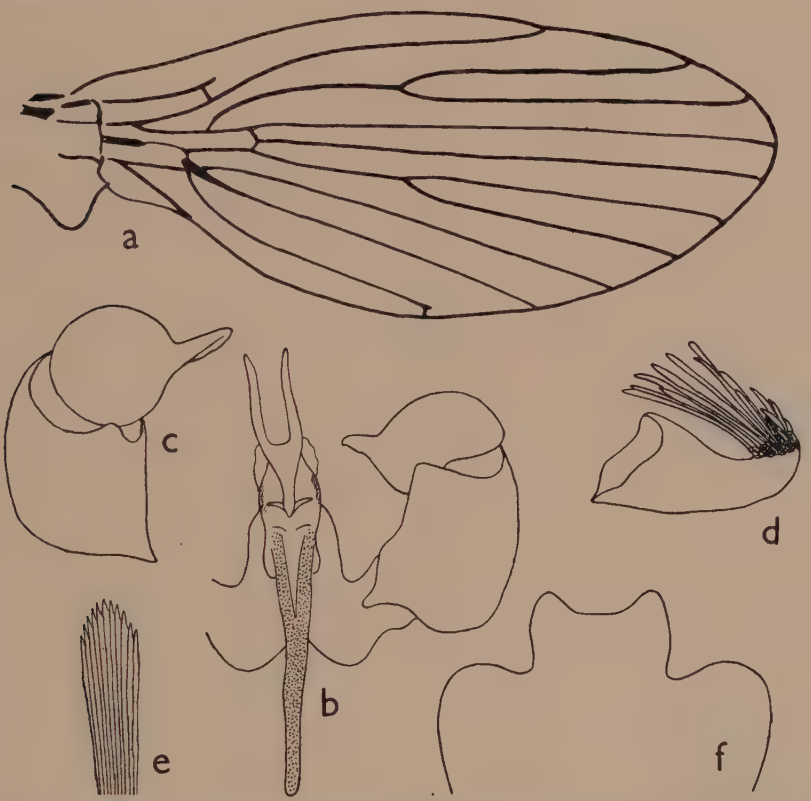


Fig. 1.—*Pericoma crispi* sp. n. (*a*) Wing ; (*b*) aedeagus, coxite and style in sternal aspect ; (*c*) coxite and style of other side viewed more from the apex ; (*d*) cercopod ; (*e*) apex of a retinaculum under high power ; (*f*) subgenital plate of female.

Pericoma crispi sp. n.

Similar to *P. gracilis* Eaton, separated by creamier scales, by the presence of a large patch of black scales on head and thorax, and by the structure of the male hypopygium.

Male.—Wing length 3·5 mm.

Head.—With conspicuous tuft of black scales on vertex continuing those on thorax, remainder creamy white; eye bridges separated by width of 5 facets; antennae normal, with fusiform segments and pale scales; mouth-parts dark.

Thorax.—Clothed with creamy white scales except for a conspicuous patch of black

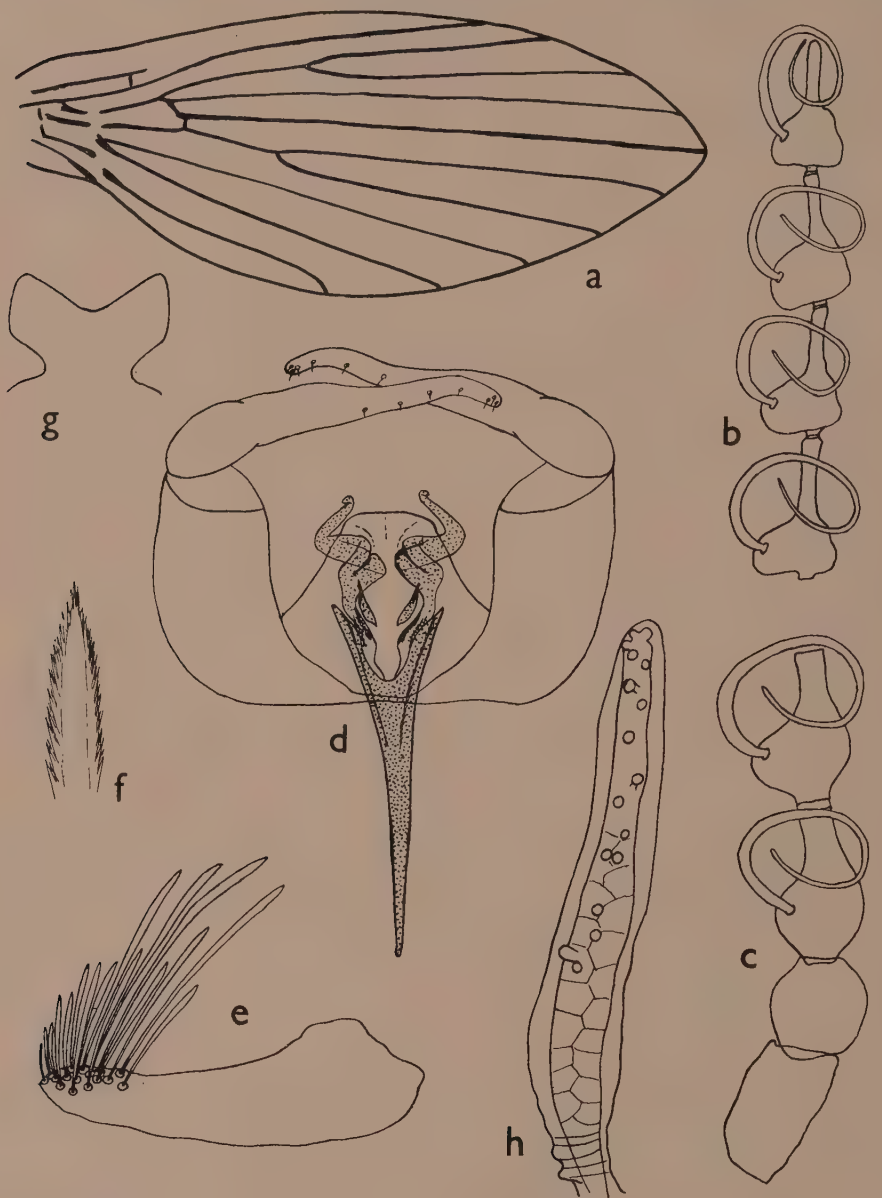


FIG. 2.—*Telmatoscopus laurencei* sp. n. (*a*) Wing; (*b*) segments 13–16 of male antenna; (*c*) segments 1–4 of male antenna; (*d*) aedeagus, coxites and styles; (*e*) cercopod; (*f*) apex of a retinaculum under high power; (*g*) apex of subgenital plate of female; (*h*) pupal respiratory horn.

scales on anterior half of mesonotum. Wings dark with two broad pale transverse bands and some pale hairs and scales basally as in *gracilis*; venation (fig. 1*a*) similar to *gracilis* but R_5 seems to run more nearly to the wing apex. Legs damaged in the only pinned male, but apparently mainly pale scaled with apices of tibiae and tarsal segments 2–5 dark.

Abdomen.—Clothed with creamy white scales. Cercopods with about 18 retinacula (fig. 1*d*), varying in size from very short to length of whole cercopod; retinacula striated and apices frayed as shown in fig. 1*e*. Styles rounded and with a short beak varying in length according to the aspect (figs. 1*b* and *c*); aedeagus very characteristic, forked as in a tuning-fork (fig. 1*b*).

Female.—Wing length 3·5 mm.

Head.—Black scale patch present but much reduced.

Thorax.—Clothed with creamy scales, anterior black patch present but much reduced in size compared with that of male. Wings as in male. Legs with a mixture of pale and dark scales on femora and tibiae, extreme apex of tibiae and base of basitarsi with creamy scales which may extend to second tarsal segment, remainder with black scales.

Abdomen.—With creamy scales, ovipositor well formed, sub-genital plate as in fig. 1*f*.

Holotype, ♂, YORKS.: Leeds, 12.ix.50 (*Ll. Lloyd* and *G. Crisp*), taken on a tree trunk in a mud-flat. Paratypes, 4 pinned females and slides of hypopygia and wings of three other males, all with same data.

Telmatoscopus laurencei sp. n.

A small dark species with no conspicuous markings, wings pointed, anterior fork the more distal, male ascoids long and curved. Rather similar to a number of other species, probably most easily confused with *T. tristis* Meigen but separable from that species by the longer ascoids and absence of scales on the wings; from *T. angustipennis* Tonnoir it is separated by the wider wings, absence of white spaces in the costal fringe, and 16-segmented antennae.

Male.—Wing length 2 mm.

Head.—With grey scales. Eye-bridges separated by width of one facet. Antennae 16-segmented, basal segments as in fig. 2*c*, apical ones with longer thinner necks (fig. 2*b*); segments 3–16 all with well developed necks and cupuliform verticils. Ascoids present in pairs on segments 3–16, each in form of a long recurved tube, broader basally.

Thorax.—Scales brownish grey. Wings rather pointed, uniformly greyish, without pale markings; venation as in fig. 2*a*, anterior fork the more distal, R_5 running into the wing-tip. Legs greyish without pale markings.

Abdomen.—With greyish scales. Cercopods with 16–18 retinacula grading from very short to rather long (fig. 2*e*), retinacula under high power appear as in fig. 2*f*. Styles long, narrow, and sinuous with a few short hairs (fig. 2*d*), aedeagus symmetrical, the two strong elements curved and twisted.

Female.—Wing length 2 mm.

Very similar to male; ascoids recurved as in male but much shorter and smaller; apex of subgenital plate as in fig. 2*g*.

Pupa.—In the absence of material of other species for comparison I am only giving a figure of the pupal respiratory horn (fig. 2*h*). This is quite similar to that of *Pericoma fusca* Meigen (*see* Satchell, 1949, *Trans. R. ent. Soc. Lond.* **100**: 441) but the arrangement of the pits is less regular.

Holotype, ♂, HERTS.: Harpenden, Rothamsted Experimental Station, 26–31.v.51 (*B. R. Laurence*), bred from the dark brown woody material from the hollow trunk of a lime tree (*Tilia* sp.). Paratypes, 8 ♂ and 4 ♀, same data as holotype. There are also two pupal skins.

Book Notices.

A Generic Revision of the Family Agromyzidae (Diptera), with a Catalogue of New World Species. By Kenneth E. Frick. *University of California Publications in Entomology* **8** (8): 339–452, text illust. (In England, Cambridge University Press), 1952. Price $1.25.

This paper, which provides a much needed revision of the family Agromyzidae, is based on a study of the types of the proposed Agromyzid genera and a large number of other North American and European species.

The distribution, economic importance and morphology of the adult and larva, as well as the historical background and systematic relationships with other families, are briefly dealt with before the actual revision.

A reference list of New World species with their present generic positions, and a very detailed bibliography complete the work.

A Brief History of Entomology. Including Time of Demosthenes and Aristotle to Modern Times with over Five Hundred Portraits. By Herbert Osborn. Pp. 303, portraits (included in pagination). 8vo. Columbus, Ohio, U.S.A. (The Spahr & Glenn Co.), 1952. Price $4.50.

This work covers the history of entomology from the beginnings of written history to the present day. It is the first condensed history of entomology covering the world at large, and deals briefly with all the more important events and stages in the development of this branch of biological science.

The emphasis throughout is upon individuals and their entomological work, and brief biographical notes are given of over 900 entomologists, with portraits of 522 of them.

NOTES ON SOME SPECIES OF *OREIXENICA* WATERHOUSE AND LYELL (LEPIDOPTERA, SATYRIDAE), WITH DESCRIPTIONS OF NEW FORMS.

By L. E. Couchman, F.R.E.S.

For more than fifty years the species included in "*Xenica*" as used in Australia have been well known and for the most part easily recognized one from the other.

Waterhouse and Lyell (1914) divided this group, separating *Nesoxenica* and *Oreixenica*, and placed under the latter, with others, the species *lathoniella* Westwood, 1851, with *herceus* W. & L., *laranda* W. & L., and *latialis* W. & L. as new subspecies.

Nominotypical *lathoniella* was considered to have come from "the neighbourhood of Hobart"; the West Tasmanian race was separated as subsp. *laranda*, the Australian subsp. as *herceus*; with *latialis* as the high altitude subspecies from "Mt. Kosciusko (above 5000 ft.)."

The subspecies *latialis* W. & L. was raised to specific rank by Waterhouse in 1923 (*Proc. Linn. Soc. N.S.W.* **48** : 18) consequent on the discovery of its different method of pupation. Later, in 1928 (*Aust. Zool.* **5** : 233–234, 25 f. 1–3) Waterhouse confirmed this action and figured the early stages.

Oreixenica paludosa (Lucas) (1892).

When discussing *lathoniella* Waterhouse and Lyell note that this species "appears to be unusually susceptible to local influences, for it has developed no fewer than four races. Dr. Lucas described a fifth, from Tasmania, but, in the absence of his type of *paludosa*, we are unable to say whether this differs from the eastern Tasmanian race."

Earlier, Waterhouse (1903) had placed *Xenica paludosa* Lucas as "probably only a small variety" of *X. orichora* Meyrick, but together with Lyell in 1914 considered it a synonym of *l. lathoniella* Westw. This conclusion may have been due to Fruhstorfer's action in 1911 in using *paludosa* Lucas as the name of the *lathoniella* subsp. from Tasmania, believing that nominotypical *lathoniella* came from the mainland.

Gaede (1931) followed Fruhstorfer, while Waterhouse (1932), although correctly placing *l. lathoniella* Westw. from Tasmania, persisted in the suggestion that *paludosa* Lucas was available as the name for a subspecies from Tasmania. Thus *paludosa* almost from the year of its publication has been placed under *orichora* or *lathoniella*, as a race name or synonym. I can find but one other reference, a note by Lyell (1900), who, when exhibiting specimens of the genus *Xenica* at a meeting of the Field Naturalists' Club of Victoria, mentioned *X. paludosa* Lucas. It is obvious from the context that Lyell had not seen Lucas' specimens, and no subsequent author seems to have even studied the original description, or the error would have been recognised, and the name adopted as valid for a distinct species of *Oreixenica*.

T. P. Lucas described *Xenica paludosa* (1892, *Proc. roy. Soc. Qd.* **8** : 71–73) from male and female specimens, although from the description it is reasonably certain that Lucas had only females before him.

There are two points of interest in the original description: "fore wings elongate, narrowly dilate"; and "male female, 20–24 mm." Bearing these in mind, it is difficult to understand how authors came to apply the description to a subspecies of *lathoniella*, since the wing form of the latter could not possibly be described as narrowly dilatate, while an expanse of 23 mm. is much smaller even than the dwarf form of *lathoniella* found at high altitudes in Tasmania.

The description, however, is very close to that of *latialis* given by Waterhouse and Lyell (1914)—"much smaller and duller, and has somewhat narrower wings" [than *lathoniella herceus*]. It also notes the subapical ocellus of forewing beneath surrounded by a ring, a character given by Waterhouse (1932) for the separation of *latialis* from *orichora* Meyrick. The "rusty brown" ground-colour, "with ochreous suffusion" particularly along the costa, is again applicable only to a female of the *latialis* group. It seems obvious from the description that the name *paludosa* can only be applied to an insect of the *latialis* group.

From my first acquaintance with the species of this genus in Tasmania I failed to find any examples of *lathoniella* to which Lucas' description could be applied, and as each season went by with more specimens gathered from more localities, at all altitudes from sea level to 3500 ft., I became convinced that authors had erred in sinking *paludosa* as a synonym of *lathoniella*.

In 1947 Mr. S. Angel, among some undoubted *lathoniella* of the usual eastern Tasmanian form, took two specimens near Lake Leake which were obviously distinct. Because of their wing shape, size and habitat it seemed possible they were related to Lucas' insect, so I appealed to my friend, N. B. Tindale, to examine all the Lucas material now in the South Australian Museum, in the hope that the types, though overlooked, were still in existence. He wrote of finding two specimens, without data, which, with one exception, corresponded closely to the original description of *paludosa*.

The wing expanse alone did not agree with Lucas' "20–24 mm.," but Tindale suggested that this was a typographical error for "30–34 mm." The author's habit was to measure the insect from wing-tip to wing-tip, as set in the old English style; using this method these two specimens gave an expanse of 31·5 mm. Tindale held that these two specimens were most likely to be the actual types, despite the lack of any data, because, as informed by R. Illidge (a contemporary of Lucas), at the time the Lucas Collection was acquired for the South Australian Museum, Lucas occasionally discarded name and data labels, when other authors sank his names, but never threw out a specimen unless completely ruined. The specimens were labelled by Tindale "*O. p. paludosa* Lucas probable type" and "*O. p. paludosa* probable co-type."

A visit to Adelaide in January, 1948, enabled me to make a direct comparison between the Lake Leake and the Lucas specimens. Immediately it was apparent that, whether the latter were or not in fact the originals on which the description of *paludosa* was based, the specimens from eastern Tasmania represented a new species, decidedly smaller, even more narrowly winged, and much more heavily marked. Certainly nothing resembling the Lucas specimens was known from Tasmania, since they were exactly like the form called *latialis* by Waterhouse and Lyell, hitherto known only from Mt. Kosciusko, New South Wales, above 5000 ft. I noted that they were two undoubted females, with the broader, more rounded wing shape, and the cream suffusion along the costa.

One specimen is set in the old English style on a common white pin; the other, however, is set with the wings well forward, on a black entomological pin. The hind-wing markings of both specimens agree with Lucas' description in that the ground-colour is broken up into a double row of small spots, as in *O. latialis*. The markings on fore and hind wings are Cinnamon Brown (Ridgway 15) in colour, possibly due to fading, and the ocelli are smaller than in the average *latialis* from Kosciusko, although they can be matched by many specimens from among the large number in the Waterhouse Collection. I could find no character which would separate either specimen from *latialis* W. & L.

It is perhaps arguable that Lucas had only these two specimens before him (although he does not say how many examples were sent him by Barnard), but without data there would seem to be grave doubts as to their authenticity, especially since the pinning and form of setting is not identical. The specimen set in the modern fashion on a black pin could hardly date from the late eighties. Lucas' description will fit only the females of a *latialis* form, however, since the males do not possess the cream suffusion along the costa, and are noticeably lighter and brighter than their females. Lucas could not possibly have failed to note the distinctiveness of the male if he really had one before him. To summarise, two points remain in doubt: the authenticity of the South Australian Museum specimens, due to lack of data, their apparent identity with *latialis* from New South Wales, and some discrepancies in size compared with the description of *paludosa*.

It is possible that if one or both of these specimens did really come to Lucas from Barnard, he in turn had them probably from R. Helms, who collected on Kosciusko just prior to the publication of Lucas' description (1890, *Rec. Aust. Mus.* **1** : 11–16). Helms's specimens are in a number of Australian collections, and G. Barnard, at this time resident in Tasmania, had corresponded widely with collectors. On the other hand, Waterhouse and Lyell, writing in 1914 of " the absence of his type," may have meant that the type was no longer in Lucas' collection, rather than that they had not seen it.

If the South Australian Museum specimens are accepted, then it seems certain that Lucas' locality was in error, and *latialis* should sink as a synonym of *paludosa*—a course I should be reluctant to accept, since *latialis* has been established beyond doubt for almost forty years.

There is then the extremely doubtful locality " near Launceston, Tasmania." If it is to be found, the female *paludosa* will be of the general form of subspp. *latialis* and *nama*, but with the ground-colour of the hind wing above broken up into a double row of small spots, as in some specimens of *O. orichora flynni* Hardy. No *Oreixenica* resembling this description has yet been found, and the species is only now recorded for the first time below 5000 ft., so that the presence of an alpine butterfly at sea level anywhere near Launceston is highly improbable.

In the circumstances I do not designate the South Australian Museum specimens as types, but accept Lucas' description as valid for a species, exact locality unknown, and associate *latialis* and the new forms I describe from Nimmitabel and Mount Buffalo as subspecies of *paludosa*.

Oreixenica paludosa nama subsp. n.[1]

Larger, above and beneath darker than subsp. *latialis* as described by Waterhouse and Lyell (1914); the black markings broader and more extensive in both sexes.

[1] " Nama," sister, in the language of the Monaro tribe.

♂. *Upperside*, fore wing: subterminal row of ground-colour spots reduced to a few scattered scales; on hind wing these spots much smaller in size than in subsp. *latialis*. *Underside:* markings of fore wing and hind wing do not lighten to a reddish tinge in the discal and apical areas, but are dead black throughout, the silver white subterminal spots of fore wing reduced to a thin irregular line, while on the hind wing the crescentic discal spots are clear silver white, only the spots in area 4 are dull yellow.

♀. *Upperside:* ground-colour of fore and hind wing thinly covered with scattered Clove Brown scales, giving entire insect a smoky appearance, and especially reducing size of spots of ground-colour in outer half of wings. *Underside:* Basal third of hind wing overlaid with scattered greenish scales, and silver white markings larger and clearer than in subsp. *latialis*. Length: fore wing 17 mm., width 9 mm.

Holotype ♂ and allotype ♀ labelled "Nimmitabel N.S.W. 27–3–51 B. Given," in the F. E. Wilson Coll. Two paratypes in my own collection, and two returned with the types to F. E. Wilson carry similar labels.

According to Waterhouse (1932) subsp. *latialis* is confined to Mt. Kosciusko above 5000 ft., but it has since been taken in the Victorian Alps near Mt. Hotham at the same altitude (Burns, 1948).

At Nimmitabel, however, subsp. *nama* is found on the plateau area at *c.* 3500 ft. It is much darker than the race from Kosciusko, the subterminal crescentic spots of fore wing in the male are greatly reduced in the type, and, in one specimen among the dozen I have examined, entirely obliterated by the terminal black band. The females have the dark shading along the veins of fore and hind wing much extended, so that the ground-colour is reduced to small spots.

The types have been selected from the middle of the range of variation.

Oreixenica paludosa theddora subsp. n.[2]

♂. Larger, and the ground-colour (Orange, Ridgway 3) deeper in tone than subsp. *latialis* as described by Waterhouse and Lyell (1914); the black markings intermediate in extent between subspp. *latialis* and *nama*.

Upperside: Fore wings:—Cell bar and discal band not joined, the discal band connected by black streaks along veins 2 and 3 to terminal band, a small ground-colour spot in area 3 below subapical ocellus. *Underside:* Postdiscal row of silver-white spots not extending below vein 2 and subapical ocellus surrounded by a fine black ring. *Hind wing:* Basal portion thinly dusted with greenish-yellow scales, and upper edge of cell spot straight, not pointed or curved as in *lathoniella*. Length: forewing 19 mm., width 10·5 mm.

Holotype ♂ labelled "Mt. Buffalo V. 13–2–51. F. E. Wilson," one ♂ paratype in my own collection, and one ♂ returned, with the type to F. E. Wilson similarly labelled.

This subspecies is fully as large and brightly coloured as *O. lathoniella herceus* but, despite its size and superficial resemblance, the characteristic markings, i.e., the arrangement of markings on the fore wing above, the ringed ocelli of the fore wing beneath, and the shape of the cell spot of the hind wing beneath, are those of *O. paludosa*.

Three males only are known, which my friend F. E. Wilson informs me were taken in "more or less open country, with low scrub and grass" near Lake Catani at an altitude of *c.* 4400 ft. To judge by these three males, this form is intermediate between *O. l. herceus* and *O. p. latialis*, having the size and colour

[2] "Theddora," the name of the tribe whose south-western boundary was Mt. Buffalo.

of the former species with the characteristic markings of the latter; when the female and the life-history are known it will be possible to decide its true position.

Oreixenica ptunarra sp. n.[3]

This species occurs in Tasmania in three well-differentiated subspecies, of which I describe in detail the nominotypical form. The characters of the species are the characters of the three subspecies here described.

FIG. 1.—Map of south-eastern Australia showing the range of *O. lathoniella herceus* and *O. paludosa* subsp. ×, *O. lathoniella herceus*; ○, *O. paludosa* subsp.

♂. Costa and termen acutely angled, giving an appearance of extreme narrowness to the fore wing. Ground-colour of fore and hind wing Pale Orange Yellow (Ridgway 3), lightening towards costal area; markings Clove Brown (Ridgway 40).

Upperside: Fore wing. Basal area: A bar in cell joined to a broad discal band extending from costa to termen, a submarginal and a marginal band Clove Brown. Subapical ocellus black centred white surrounded by a narrow orange ring. Cilia Light Buff (Ridgway 15), at veins Clove Brown. Hind wing:—Basal, submarginal and marginal bands Clove Brown, broadened and joined so that the ground-colour appears only as a few small dots, one in cell, a discal row of four in areas 3, 4, 5 and 6, minute postdiscal dots in areas 3 and 5, and a subterminal row of five semi-lunar spots. Subtornal ocellus black centred white, surrounded by a Mars Yellow (Ridgway 3) ring, outlined by a Clove

[3] "Ptunarra," frigid (cold) in the dialect of the western tribes of Tasmania.

Brown line. Cilia as in fore wing. *Underside :* Markings as above, submarginal and marginal bands suffused Claret Brown (Ridgway 1); a narrow subterminal silver white line broken by the veins extends from costa to I*a*. Subapical ocellus as above, cilia as above. Hind wing suffused Claret Brown, the basal half dusted over with silver-white scales ; a narrow basal crescentic spot, a costal and two cell spots, a median spot in area I*a*, a narrow band before subapical ocellus extending to area 3, a broad crescentic spot in areas 1, 2 and 3 enclosing subtornal ocellus, and six subterminal semi-lunar spots, all silver white. Subapical and subtornal ocelli black, white centred, surrounded by Deep Chrome (Ridgway 3) rings which are outlined by fine Clove Brown lines ; terminal lines Clove Brown. Cilia as above. Length : fore wing 13 mm., width 7 mm.

♀. Costa of fore wing almost straight, hind margin well rounded. Ground-colour of fore and hind wings Capucine Yellow (Ridgway 3), markings Clove Brown.

Upperside : Fore wing : Basal third, cell bar, discal bar and apex above ocellus, Clove Brown ; some scattered brownish scaling tending to connect cell and discal bars and extending along veins 2, 3 and 4 towards termen ; a narrow postdiscal bar from costa to 4, cream ; a narrow subterminal cream line bounded by a narrow Clove Brown marginal line. Subapical ocellus black centred white, the black ring extended slightly towards apex. Cilia light buff, at veins Clove Brown. Hind wing : Basal third Clove Brown, acutely angled in area 4, and merging into ground-colour at half, enclosing a small Ochraceous Orange (Ridgway 15) spot in cell, a row of six submarginal semi-lunar spots, cream ; marginal line Clove Brown, a subtornal ocellus black centred white. Cilia light buff, at veins Clove Brown. *Underside :* Fore wing markings as above, a narrow silver-white submarginal line from costa to vein 2. Subapical ocellus black, centred white, surrounded by a light Orange Yellow (Ridgway 3) ring, enclosed by a Clove Brown ring. Cilia as above. Hind wing : Suffused Brick Red (Ridgway 13), the basal half with scattered silver-white scaling. Dorsum, I*b* and base of median vein, basal spots in I*a*, 2 and 3 enclosing ocellus and a submarginal row of six semi-lunar spots, all silver white ; marginal band Clove Brown divided by a very fine cream line. Subapical and subtornal ocelli black centred white, surrounded by a Light Orange Yellow ring, encircled by a fine Clove Brown ring. Cilia Light Buff, at veins Clove Brown. Length : fore wing 13·5 mm., width 7 mm.

Holotype ♂ labelled " Miena, Tas. 3300 ft. 1–March–52. R. Dobson " ; allotype ♀ " Miena, Tas. 3300 ft. 8–March–52. R. Couchman."

This, the smallest and perhaps most primitive form of this distinctive new species, was found flying low over rough grassy slopes in open *Eucalyptus* forest bordering the marshy areas adjacent to the Great Lake, in the western central plateau of Tasmania.

Oreixenica ptunarra roonina subsp. n.[4]

♂. Differs from *pt. ptunarra* in its greater size, angle of costa and termen not acute, Clove Brown bands of fore and hind wing restricted leaving the Pale Orange Yellow (Ridgway 3) spots as large again as in *pt. ptunarra*.

Upperside. Fore wing : Spot in area 2 rectangular, 3·5 mm. long ; spot in area 3 extended to join a spot below ocellus, submarginal line 1 mm. wide from costa to inner margin. Hind wing : Ground-colour spotting large and clearly defined, that in area 3 extended to join the postdiscal spot, an additional postdiscal spot in area 1*a* below ocellus. *Underside :* Postdiscal area of hind wing suffused brick red, silver-white markings broadened and extended to form a band from costa to 1*a*, faintly divided at veins 4 and 5, almost enclosing subtornal ocellus. Length : Fore wing 16 mm., width 8 mm.

♀. Larger, markings broader and more extensive than in *pt. ptunarra*, cell and discal bars black.

[4] " Roonina," grass, in the dialect of the Big River tribe of central Tasmania.

Upperside. Fore wing : Cell almost enclosed by an extension of the discal band, which nearly meets lower edge of cell bar, this band clearly joined to terminal band along veins 2, 3 and 4. In addition three narrowly elongated cream apical spots. Hind wing : Basal patch clearly defined, enclosing cell spot 1·5 mm. square. *Underside :* Silver-white markings of fore and hind wing broadened and extended as in male. Length : Fore wing 16·5 mm., width 8·5 mm.

Holotype ♂ and allotype ♀ labelled " Mike Howes Marsh, Tas. 2100 ft. 23– March. L. E. Couchman."

This locality is some eight miles from Oatlands and is about 1200 ft. lower than the habitat of *pt. ptunarra.*

FIG. 2.—*O. ptunarra angeli* subsp. n., male. Lake Leake area, Tasmania, 16th March, 1948.

Oreixenica ptunarra angeli subsp. n.

♂. Intermediate in size between subspp. *ptunarra* and *roonina*, spots of fore and hind wing shaped as in *roonina*, but smaller ; differing also from the western races in the ground-colour, which is Antimony Yellow (Ridgway 15).

Upperside : In holotype specimen white centre in subapical ocellus of fore wing minute, but often completely absent. *Underside :* Discal silver-white band of hind wing clearly interrupted at veins 4 and 5. Length : Fore wing 14 mm., width 7 mm.

♀. Intermediate in size between subspp. *ptunarra* and *roonina*, differing in ground-colour, which is Ochraceous Orange (Ridgway 15).

Upperside : Fore wing discal band encloses cell and is continued across Ia to inner margin. Hind wing : A narrow postdiscal Clove Brown band faintly connected along veins to basal patch. *Underside :* Markings as in male. Length : Fore wing 15 mm., width 8 mm.

Holotype ♂ and allotype ♀ labelled " Lake Leake, Tas. 18–2100 ft. 16–March –48. L. E. Couchman." Paratypes have been presented to the South

Australian Museum, Adelaide (Reg. No. I.18979); Australian Museum, Sydney; National Museum, Melbourne; and the British Museum (Natural History), London; others remaining in my own collection and with S. Angel, after whom this subspecies has been named.

O. ptunarra angeli is found in the grassy meadows bordering the swamps near Lake Leake in the upland area of north-eastern Tasmania, but occasionally it is to be found threading its way through the dense masses of *Lepidosperma longitudinale* Lab., a plant commonly found in these swamps. It has a quite characteristic flight, usually only a few inches from the ground, the male especially flying in a much more direct and speedy manner than *l. lathoniella.*

After several years' failure subsp. *angeli* has at last been reared from known parents, thus settling some early doubts as to the sexes.

Life History.

Eggs laid on 19th March, 1948, emerged on 30th April, 1948. The egg is spherical, as wide as high, ·75 mm. in diameter, ·75 mm. high, slightly flattened at the base; bright Neva Green (Ridgway 5), very finely ribbed from base to micropyle, which is not depressed. The colour gradually changes to greenish yellow shortly before emergence. The eggs are dropped loosely among herbage, adhering to anything they touch. Twenty-four hours after emergence the larva was 1·75 mm. long, yellowish green in colour, the head, segments and anal plate thinly covered with short black hairs. These, and successive batches, were lost during the winter months; it was not until 1950 that larvae were successfully brought through the winter, and it is from them that the following description is made:

Full-fed larva, 3rd February, 1951, tapering sharply to head and bifid tail, 19 mm. long, 4·5 mm. wide across greatest width, head 2 mm. wide; segments greenish grey, lightening in tone towards head and tail, dorsal line 0·5 mm. wide, Olive Brown; bounded on either side by a narrow cream line; a narrow median line, Olive Brown; a narrow subspiracular line and a spiracular band, cream. Head with a few scattered short black hairs.

The larvae feed at night, on the extreme tips of grass, hiding during the day deep down in the tufts. During a period of two or three days before pupation the larva shrinks markedly, the longitudinal lines fade and become very faint, the general colour becoming creamish white. Just prior to pupation the larva gets right down in the grass tuft, seeming to choose a position where the pupa will be supported by a fork in the grass stems. Pupation took place on 12th February, 1951, the pupa being loose and unattached, resting in a fork of grass.

Pupa 9·5 mm. long, 3·5 mm. wide across wing covers; greenish grey flecked with black, a pair of black spots on each segment of body.

Compared with the pupa of *lathoniella* this species is less humped, quite smooth without the prominent tubercles on each segment, and the segments not markedly divided as in that species. The imago, a male, emerged on 16th March, 1951. Females emerged during the period 12th–18th March; reared as they were at Hobart near sea-level, under much more congenial conditions than in nature, these females were exceptional in size and richness of ground colour.

Discussion.

This distinctive new species was first found near Lake Leake by S. Angel, when we were engaged in a search for an *Oreixenica* which would approximate Lucas' description of "*paludosa.*" When the first female specimen of subsp. *angeli* was in my net I thought it possibly the long lost "*paludosa,*" but having examined some hundred examples from the three known localities, I am convinced it cannot be Lucas' species. All the females I have seen have, on the hind wing upperside, an unbroken band of ground-colour extending from costa to inner margin, the western examples tend to be completely unmarked, and all forms are thinly scaled. The males, with their dark heavy markings, are quite unlike any other species in the genus.

FIG. 3.—Map of Tasmania showing the range of *O. ptunarra* subsp. + *O. ptunarra* subsp.

Subsequently the range of the species was extended when R. Dobson found a few specimens near the Great Lake, while subsp. *roonina* was found after possible localities for the new species had been mapped out and systematically explored. An alpine species, it seems to be confined to the vicinity of mountain lakes and swamps between 2000–3500 ft., but it is very local in its habitat. It flies from early March to early April, at a time when *l. lathoniella* and all other species in these areas are almost over, and although common where found, it must suffer severely from the effects of the autumn storms prevalent at these altitudes.

In pattern and extent of marking the females show a gradual transition from west to east, from the thinly scaled pale subsp. *ptunarra*, in which the

fore wing markings are almost absent, through subsp. *roonina* to the completely banded subsp. *angeli*. The males, however, reverse this transition, since the nominotypical subspecies is the smallest, darkest form of all in that sex; in some specimens the hind wings are almost spotless, unmarked Clove Brown except for the subtornal ocellus; the geographically intermediate *roonina* is by far the largest and lightest form, although but 1200 ft. lower and thirty-four miles distant from the habitat of *ptunarra*, while the isolated north-eastern *angeli*, separated by the broad valley of the Macquarie River, forms a perfect intermediate in extent of marking and reduction of ground-colour between *ptunarra* and *roonina*. Sexual dimorphism is most pronounced therefore in *ptunarra*, the western race, although the sexes are still very unlike in the north-eastern *angeli*.

The variation, especially in *angeli*, is extensive. There is a frequent extension of the subapical ocellus of fore wing above towards the apex, occurring in males but more frequently in females, resulting in extreme examples with double ocelli, a characteristic marking in *O. orichora flynni*. Specimens of both sexes occur with a dot in area 4 below this ocellus; in one example this dot is pupilled. Occasional females have the apical ocellus of hind wing beneath reproduced above.

In a few males the discal band of the fore wing above does not reach the inner margin, leaving a broad area of ground-colour extending from basal patch to tornus. These forms may be named in future work on the genus.

Oreixenica lathoniella (Westwood) [1851].

Some doubt has existed as to the form of marking in typical *lathoniella* (Waterhouse, 1932 : 115), but there is a specimen in the Waterhouse Collection labelled "KLO 1963 Hobart, Tas., G. H. Hardy. 3–3–17/8 compared with B.M. Type." This is a male, wing length 17 mm., width 9 mm., of the form found most commonly in the Hobart district, in which the black discal band joins the cell bar but does not extend below vein 2, leaving an unbroken patch of ground-colour from the black basal band to the black marginal band at tornus.

Accepting this as the type form of *lathoniella*, there exist all the gradations to a form in which the discal band completely crosses the fore wing, from examples with a minute black dot in area Ia and a thin black line along inner margin, to specimens in which the discal band is complete from costa to inner margin up to a width of 3 mm.

I call this form **maweena**[5] f. nov. The holotype female is a specimen with fore wing length 17 mm., width 9 mm., the black discal band extending from costa to inner margin, 1·5 mm. wide where it crosses vein I*a*; labelled "Knocklofty, Tas. 750 ft. 15–January–51. L. E. Couchman. Bred ab ovo." This locality, a foothill of Mt. Wellington, is less than two miles distant from the Hobart G.P.O., and probably close to the spot from which the type of *lathoniella* originated.

This type of variation occurs in both sexes, but more commonly in the female; it is occasional also in subsp. *laranda* from western Tasmania and subsp. *herceus* in Victoria and New South Wales. In Tasmania it seems to appear more

[5] "Maweena," charcoal, in the language of the Oyster Bay tribe of S.E. Tasmania.

commonly at an altitude. In a series of four from Miena at 3300 ft., taken 8th March, 1952, two females are f. *maweena* ; of five females from the Steppes, 2500 ft., taken on the same day two are of this form ; among five females from Interlaken at 2700 ft., taken 23rd March, 1952, two are of this form. It occurs sporadically on and around Mt. Wellington, particularly above 750 ft., but of five from Glenorchy at sea level near Hobart, taken 23rd February, 1943, only one is form *maweena*, while six from Alonnah, South Bruny Island, taken on 3rd March, 1947, at the water's edge, are all of the typical form.

The east Tasmanian subspecies emerges much earlier than *herceus* in Victoria and New South Wales. Here we have taken *l. lathoniella* near Lunawanna at sea level on 12th January, 1948 ; at 750 ft. near Hobart on 14th January, 1951, at 2100 ft. near Lake Leake on 19th January, 1951 ; on 20th January, 1946, at Lake Echo, 2729 ft. ; and throughout February and March to 23rd March, 1952, at 2700 ft. near Interkalen, the latter series of five females being all that were seen that day. Subspecies *laranda* from the high rainfall areas of the West Coast seems to be found only from mid-February to mid-March, while subsp. *herceus* seems to appear earlier at an altitude. I have seen specimens from Lorne at sea level taken early in February, but in the Dandenong Ranges near Melbourne, where they occur down to about 500 ft., they do not seem to emerge before mid-March, and are most common throughout April. In the Victorian Alps at the higher altitudes they appear at least a month earlier ; F. E. Wilson has specimens taken at 4600 ft. on Mt. St. Bernard on 17th February, 1947. This subspecies is found at an altitude along the Great Dividing Range through the Blue Mts. around Katoomba to Dorrigo in northern New South Wales ; throughout these areas it appears from March to mid-April.

In appearance the specimens examined from Deervale, near Dorrigo, do not differ materially from Victorian examples, However, at high altitudes in the Victorian Alps, notably from Mt. St. Bernard, 5800 ft., through Whiskey Creek and Glen Wills at *c.* 5000 ft. to New South Wales at Nimmitabel, 3500 ft. and Mt. Kosciusko, 4–5000 ft., there is a gradual reduction in the size of the submarginal row of ground-colour spots of fore and hind wing above, due to the extension of the black marginal bands. This reduction seems to reach its maximum in specimens from the vicinity of Canberra, A.C.T. ; examples from Lees Springs at 3600 ft. have these spots on fore wing almost obliterated and on hind wing greatly reduced in size.

When we know more about the high altitude forms of this very variable species it may be possible to separate other forms than those enumerated here, but much more collecting is desirable.

The following key will separate the known Tasmanian species :

Key to Tasmanian Species of *Oreixenica*.

1 (4) Subapical ocellus of fore wing beneath single.

2 (3) Annular area surrounding subtornal ocellus of hind wing above unicolorous with ground-colour.

2*a* Pale ring surrounding subapical ocellus of fore wing beneath clearly lighter than surrounding area, usually outlined by dark ring **ptunarra** ♀.

2*b* Pale ring surrounding subapical ocellus of fore wing beneath not noticeably lighter and not outlined by dark ring **lathoniella** ♂ and ♀.

3 (2) Annular area surrounding subtornal ocellus of hind wing above much darker in tone than ground-colour . . . . . **ptunarra** ♂.
4 (1) Subapical ocellus of fore wing beneath double, upper often blind **orichora flynni** ♂ and ♀.

Summary.

The discovery of an *Oreixenica*, here named *O. ptunarra*, from the alpine marshes of Tasmania led to an investigation of the name "*Xenica paludosa*" published by Lucas in 1892, and hitherto treated by authors as a synonym of *O. lathoniella* Westwood.

This name is now established as valid for a species, exact locality unknown, and *latialis* Waterhouse and Lyell is regarded as a subspecies from Mt. Kosciusko, N.S. Wales, with new subspecies from Nimmitabel, N.S.W., and from Mt. Buffalo, Victoria.

Three distinct subspecies of *O. ptunarra* are described, from the Great Lake, from Mike Howes Marsh and from Lake Leake, Tasmania; the life-history is also recorded.

The range and variation of *O. lathoniella* is discussed, the type form from Tasmania defined, and a new form, found in all subspecies and in both sexes, is named from the neighbourhood of Hobart.

Acknowledgments.

I am indebted to N. B. Tindale for his ready help in the search for Lucas' specimens, and to him and the Director of the South Australian Museum for much help and advice while studying the material in Adelaide; to A. Musgrave and W. A. Rainbow for facilities and help afforded my wife and later myself while studying the Waterhouse Collection in the Australian Museum, Sydney; to S. Angel, F. E. Wilson and D. Crosby for the loan of much material and for their enthusiastic field work, which has added so much to our knowledge of this fascinating group of alpine butterflies.

References.

Burns, A. N., 1948, *Mem. nat. Mus., Melbourne* **15** : 103–104.
Fruhstorfer, H., 1911, *in* Seitz, *Grossschmett. Erde* **9** : 304.
Gaede, M., 1931, *in* Strand, *Lep. Cat.* **43** : 82.
Lucas, T. P., 1892, *Proc. roy. Soc. Qd.* **8** : 71–73.
Lyell, G., 1900, *Vict. Nat.* **17** : 112.
Ridgway, R., 1912, *Color Standards and Color Nomenclature.* Washington.
Waterhouse, G. A., 1903, *Mem. N.S.W. Nat. Cl.* **1** : 18.
——, 1923, *Proc. Linn. Soc. N.S.W.* **48** : 18.
——, 1928, *Aust. Zool.* **5** : 233–234, 25, f. 1–3.
——, 1932, *What Butterfly is that?* : 115. Sydney.
—— and Lyell, G., 1914, *Butterflies of Australia* : 42. Sydney.

5. BEITRAG ZUR KENNTNIS DER *MALACODERMATA* AFRIKAS.

By W. Wittmer.

(*Buenos Aires.*)

Die in der vorliegenden Arbeit beschriebenen Arten entstammen fast alle einer Bestimmungssendung, welche ich vom British Museum, London, erhalten habe.

Drilidae.

Selasia bicolor sp. n.

♂. Schwarzbraun, Kopf und Halsschild gelb, Beine und Fühler etwas heller als die Flügeldecken.

Kopf mit den Augen etwas schmäler als der Halsschild, Stirne fast flach, Clypeus zwischen den Fühlerwurzeln deutlich längseingedrückt, Oberfläche fast glatt, fein hell behaart. Fühler vom 4. Gliede an gekämmt, Lamelle des 4. Gliedes etwas länger als halb so lang wie beim 5., 3. mit einem dreieckigen Zahn etwas vor der Spitze. Halsschild etwas breiter als lang, Seiten geradlinig, nach vorne schwach verengt, Scheibe leicht gewölbt, glatt, Behaarung hell, wenig dicht. Flügeldecken runzlig gewirkt mit zahlreichen deutlichen Längslinien, welche an der Basis am tiefsten sind und gegen die Spitze allmählich erlöschen.

Länge: 3·5–5 mm.

Fundort: South Africa: Port St. John, Pondoland, viii.1923 und i.1924 (*leg. R. E. Turner*). Holo-, Allo- und Paratypen in der Sammlung des British Museum, London, Paratypen in meiner Sammlung.

Neben *S. basiimpressa* m. zu stellen, leicht zu unterscheiden durch den gelben Kopf und Halsschild. *S. basiimpressa* ist einfarbig dunkelbraun gefärbt.

Cantharidae.

Bei der Beschreibung der Gattung *Afronycha* (1949, *Ann. Mag. nat. Hist.* (11) **12**: 746) wurde übersehen die Genotype anzugeben. Genotype ist: *A. bivittata* (F.) (1798, *Ent. Syst.* (*Suppl.*): 69).

Malthinus pondolandicus sp. n.

♂. Einfarbig braun, nur die Wangen und der Clypeus mehr oder weniger und manchmal auch der Basalrand des Halsschildes äusserst schmal, hell gefärbt.

Kopf mit den Augen breiter als der Halsschild, ziemlich grob gewirkt punktiert, einzelne Punkte ineinanderfliessend. Fühler länger als der halbe Körper, 2. Glied so lang wie das 3., 4. eine Spur länger als das 3., 5. und folgende deutlich länger als das 4. Halsschild brieter als lang, Seiten fast parallel, nach vorne kaum merklich verengt, Basalrand deutlicher abgesetzt als der Vorderrand, Oberfläche wie der Kopf punktiertgewirkt. Flügeldecken wie üblich verkürzt, leicht klaffend, mit einigen zerstreuten, erloschenen Punkten.

Länge: 2·8–3·5 mm.

Fundort: South Africa: Port St. John, Pondoland, 15–31.viii.1923 (*leg. R. E. Turner*). Holo- Allo- und Paratypen in der Sammlung des British Museum, London, Paratypen in meiner Sammlung.

Es ist dies die zweite aus Südafrika bekanntgewordene *Malthinus*-Art, welche sich von der ersten, *capensis* m. durch längere Fühler, bei denen das 2. Glied so lang wie das 3. ist und den stark gewirkten Halsschild unterscheidet. Bei *capensis* ist das 2. Glied kürzer als das 3. und der Halsschild fast glatt, auch der Kopf ist viel weniger stark gewirkt als bei *pondolandicus*.

Prosthaptus cameroonensis sp. n.

♂. Schwarz, vorderer Teil des Kopfes, vom Vorderrand der Augen an, Fühler, nur die Endglieder etwas angedunkelt, Spitzen der Flügeldecken, Schienen und Tarsen, Schenkel teilweise, gelb.

Kopf mit den Augen etwas breiter als der Halsschild. Fühler (fig. 1) ziemlich lang, 2. Glied so lang wie breit, 3. stark verlängert, ungefähr so lang wie das 4. bis 6. zusammengenommen und etwas dicker als dieses, mit einer Längsfurche von der Spitze bis etwas über die Mitte und einer kleinen länglichen Grube vor der Basis, in einer Linie mit der Längsfurche (die basale Längsgrube ist je nach Beleuchtung nicht immer gut zu erkennen), 4. Glied etwas kürzer als das 5. Halsschild etwas breiter als lang, Seiten kurz vor der Mitte mit einem zahnartigen Vorsprung, von da nach vorne stark konisch verengt, Seiten vom Seitenzahn zur Basis fast parallel, Scheibe fast glatt, fein behaart. Flügeldecken stark verkürzt, schwach runzlig, fast glatt.

♀. Kopf ganz schwarz, Fühler schwarz, ausgenommen die beiden ersten Glieder und die Basis des 3. Fühler einfach, 2. bis 4. Glied unter sich gleich lang. Seiten des Halsschildes kaum weniger stark zahnartig vorspringend als beim ♂.

Länge: 2·5–3 mm.

Fundort: British Cameroons: Cameroon Mt., Buea Slope, 4500 feet, 17.v.1949 (*leg. Borys Malkin*). Holo- und Allotype in der Sammlung der California Academy of Sciences, San Francisco.

Neben *P. mirabilicornis* (Pic) zu stellen. Ausser der verschiedenen Fühlerform, durch die Färbung der Flügeldecken, welche an der Spitze breit gelb gefärbt sind, leicht von *mirabilicornis* zu unterscheiden, bei der sie einfarbig schwarz sind.

Malachiidae.

Cephaloncus somalicus sp. n.

♂. Kopf und Halsschild orangegelb, Fühler gelb, vom 5. oder 6. Gliede an leicht angedunkelt, Beine bräunlich, Hinterschenkel zum Teil angedunkelt, Flügeldecken schwarz mit schwachem, bläulichgrünem Schimmer.

Kopf (fig. 2) mit den Augen deutlich breiter als der Halsschild, Interokularaushöhlung tief, sie erstreckt sich von Auge zu Auge, in der Mitte ein kleiner Tuberkel, Vorderwand der Aushöhlung in der Mitte vor dem Mittelzahn ebenfalls schwach zahnförmig ausgezogen, daneben jederseits schwach napfförmig eingedrückt, Clypeus bis zur Oberlippe tief längseingedrückt. Fühler nicht sehr lang, 2. Glied knötchenförmig, 3. so lang wie das 4., 5. und 6. etwas länger als das 4. Halsschild breiter als lang, vor der Mitte am breitesten, gegen die Basis stärker verengt als nach vorne, Basalecken vollständig verrundet, Scheibe flach, glatt, Basalrand kaum abgesetzt. Flügeldecken fein erloschen punktiert, äusserst fein behaart.

♀. Kopf flach, ohne Aushöhlung, Fühler etwas kürzer.

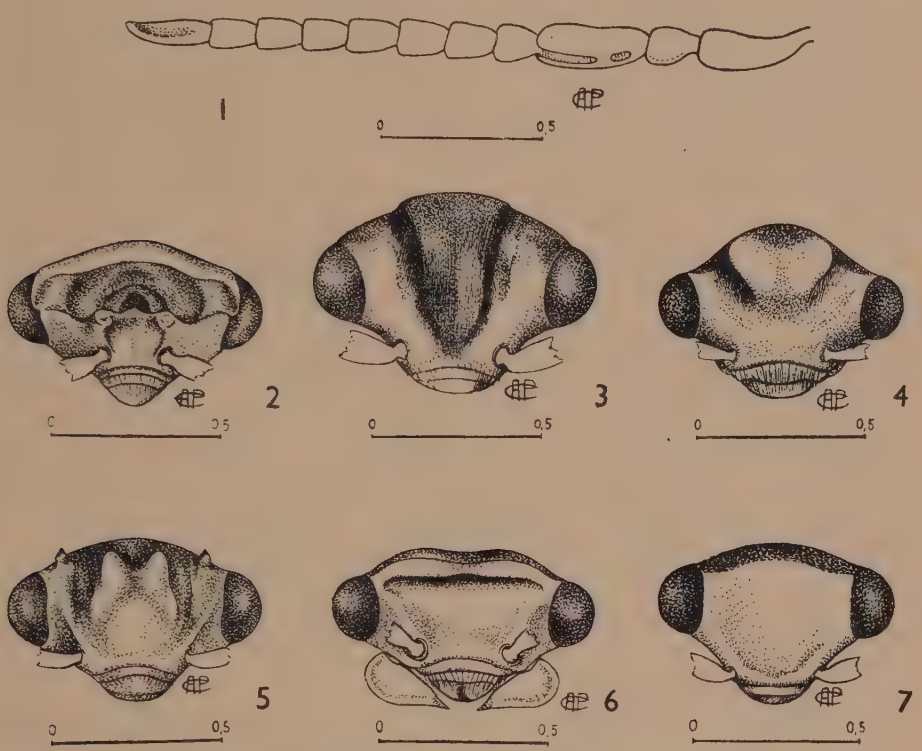
Länge: 2–2·2 mm.

Fundort: Brit. Somaliland: Dolphin Bay, 22.iii.1903 (*leg. Dr. M. Cameron*). Holo- und Allotype in der Sammlung des British Museum, London, Paratype in meiner Sammlung.

Die Art ist neben *C. bispinus* m. zu stellen, durch den einfarbig rotgelben Kopf und Halsschild in beiden Geschlechtern leicht von *bispinus* zu unterscheiden.

Colotes pallidulus sp. n.

♂. Gelborange, Flügeldecken etwas blasser gelb als Kopf und Halsschild, entweder einfarbig oder jede Decke mit einem dunkeln Längsstreifen, der weder die Naht noch die Seiten berührt, in der Mitte jederseits oft verschmälert, manchmal so stark, dass der Längsstreifen in eine basale Makel und eine Makel vor der Spitze aufgelöst wird. Unterseite gelbe, Mittel- und Hinterbrust etwas angedunkelt.



FIGS. 1–7.—(1) Fühler von *Prosthaptus cameroonensis* sp. n., ♂. (2)–(7) Kopf von. (2) *Cephaloncus somalicus* sp. n., ♂. (3) *Colotes scotti* sp. n., ♂. (4) *C. bigibbosus* sp. n., ♂. (5) *C. tuberculifrons* sp. n., ♂. (6) *C. sulcifrons* sp. n., ♂. (7) *C. planifrons* sp. n., ♂.

Kopf mit den Augen schmäler als der Halsschild, Stirne leicht gewölbt, fast glatt, Behaarung äusserst fein. Fühler die Schulterbeulen berührend. Halsschild breiter als lang, Seiten gegen die Basis stark gerundet verengt, Basalecken vollständig mit den Seiten verrundet, wenig gewölbt, fast glatt. Flügeldecken nach hinten leicht verbreitert, obwohl die Schulterbeulen stark zurückgebildet sind, scheint die Art die Flugfähigkeit bewahrt zu haben, denn bei einem Exemplar ist der komplette Flügel sichtbar, Punktierung deutlich, ziemlich dicht. Meistens sind die letzten 1 oder 2 Abdominaltergite unbedeckt.

Länge: 2 mm.

Fundort: S.W. Africa: Aus, xi–xii.1929 und Okahandja, 3–11.xii.1927 (*leg. R. E. Turner*). Holo-, Allo- und Paratypen in der Sammlung des British Museum, London, Paratypen in meiner Sammlung.

Neben *C. ogieri* Fairm. zu stellen, jedoch heller gefärbt, Flügeldecken stärker punktiert.

Colotes scotti sp. n.

♂. Kopf schwarz, Raum zwischen Auge und Stirnhöcker (ausgenommen an der Stirnbasis) bis zum Clypeus, gelb. Fühler schwarz, ausgenommen die ersten 3 Glieder und manchmal auch die Basis des 5., 1. Glied gelb mit einem kleinen dunkeln Punkte, auf der Oberseite, fast an der Spitze, 2. Glied nur auf der Unterseite gelb, 3. einfarbig gelb, 4. glänzend mit violettem Schimmer, 5. an der Basis oft aufgehellt, gelb. Halsschild gelborange mit einer grossen, breiten schwarzen Makel am Vorderrande, welche sich gegen die Basis verjüngt und sich oft bis zur Basis erstreckt. Flügeldecken schwarz mit schwachem grünlichem Metallschimmer. Unterseite und Beine schwarz, äusserste Spitze der Schenkel manchmal leicht aufgehellt.

Kopf (fig. 3) mit den Augen eher breiter als der Halsschild, Stirne mit einem länglichen Höcker versehen, der an der Basis am breitesten und in der Mitte am höchsten ist, gegen den Clypeus verschmälert und verflacht er sich, Mitte mit einer seichten Längsdepression versehen. Fühler ziemlich lang, 1. Glied so lang wie das 2. und 3. zusammengenommen, ziemlich stark verdickt, 2. kaum breiter als lang, fast dreieckig, 3. ungefähr doppelt so lang wie das 2., Aussenrand leicht gekrümmt, innen gegen die Spitze etwas verbreitert, 4. leicht flachgedrückt, breiter als das 3., nur wenig länger als breit. Halsschild breiter als lang, Seiten gegen die Basis gerundet verengt, Basalecken mit den Seiten vollständig verrundet Basalrand und Seiten in der Basalrundung leicht aufgewölbt, Oberfläche glatt, kaum mikroskulptiert. Flügeldecken nach hinten leicht erweitert, zerstreut, ziemlich dicht punktiert, fein greis behaart.

♀. Kopf einfach, einfarbig schwarz, Fühler schwarz nur das 1. Glied aufgehellt.

Länge: 2·2–2·3 mm.

Fundort: South Africa: Basutoland, Maluti Mts., Nyakoesuba, 6700 feet, 19.ii.1929 (*leg. Dr. Hugh Scott*). Holo- und Allotype in der Sammlung des British Museum, London, Paratype in meiner Sammlung. Dem Entdecker gewidmet.

Diese Art gehört in die Verwandtschaft von *C. frontalis* Champ. und *C. nasutus* Champ. Von beiden ist sie, abgesehen von der verschiedenen Kopfform und Färbung der Fühler, leicht an den einfarbig schwarzen Flügeldecken zu erkennen, welche bei beiden Arten von Champion bläulich oder blaugrün sind mit weisslichem Seitensaum, der sich nach hinten bis über die Mitte erstreckt.

Colotes bigibbosus sp. n.

♂. Kopf inklusive Palpen, gelb, nur die Augen und die äusserste Basis der Stirn dunkelbraun, Fühler schwarzbraun, Basis und Unterseite des 1. Gliedes, 2. vollständig, gelb, Spitzenglieder manchmal ebenfalls etwas aufgehellt, Halsschild mit grosser, querer schwarzbrauner Makel, welche weder den Vorder- noch den Basalrand berührt, gegen die Basis unregelmässig abgegrenzt, in 3 oder 5 Arme auslaufend. Flügeldecken schwarz, oft mit schwachem grünlichem Schimmer, Naht, Spitzen und Seiten schmal gelb gesäumt, in der Mitte der Seiten ist der gelbe Saum breiter als an den Schultern und vor den Spitzen. Kiefertaster und Beine vollständig gelb, Unterseite grösstenteils gelb.

Kopf (fig. 4) mit den Augen etwas breiter als der Halsschild, mit zwei höckerförmigen Anschwellungen, welche am deutlichsten bei der Ansicht von oben zu sehen sind. Bei der Ansicht von vorne (siehe Abbildung) kommen die beiden Höcker kaum zur Geltung.

Fühler ziemlich langgestreckt, 1. Glied langgezogen, schmal, länger als das 2. und 3. zusammengenommen, 2. knötchenförmig, 3. bis 5. verbreitert, unter sich gleich breit, 3. kürzer als das 4., 6. schmäler als das 5., aber immer noch breiter als das 7., 8. bis 11. normal. Halsschild viel breiter als lang, Seiten gegen die Basis gerundet verengt, Basalecken mit den Seiten vollständig verrundet, Basalrand in den Basalecken nur wenig aufgewölbt, Oberfläche fein mikroskulptiert. Flügeldecken nach hinten kaum erweitert, ziemlich dicht und grob punktiert, fein greis behaart.

♀. Färbung ähnlich wie beim ♂, Kopf mit oder ohne dunkle Färbung der Stirnbasis, Flecken auf dem Halsschild meist kleiner, oft fast rechteckig, Seiten der Flügeldecken breiter gelb als beim ♂. Kopf einfach.

Länge: 2·3–2·5 mm.

Fundort: South Africa: Matjesfontein, xi/xii.1928 (*leg. R. E. Turner*). Holo-, Allo- und Paratype in der Sammlung des British Museum, London, Paratype in meiner Sammlung.

Neben *C. frontalis* Champ. zu stellen, leicht erkenntlich an dem Stirnhöcker welcher in 2 Hälften geteilt ist und an der Färbung der Flügeldecken mit der gelben Naht, Spitzen und Seiten.

Colotes tuberculifrons sp. n.

♂. Kopf gelb, Augen, Stirnbasis und jederseits zwischen Auge und Stirnmitte ein schmaler Längsstreifen, der sich gegen den Clypeus verliert, schwarz. Fühler braun, 1. Glied und Endglieder aufgehellt, die grösste Mehrzahl der Glieder auf der Unterseite mehr oder weniger aufgehellt. Halsschild schwarz, ein schmaler Basal- und Vordersaum gelb, die gelbe Färbung am Vorderrand zieht sich als schmaler Streifen fast bis zur Halsschildmitte. Flügeldecken grün metallisch glänzend, Seiten von unter der Schulter bis über die Mitte schmal gelblichweiss gesäumt, Beine gelb.

Kopf (fig. 5) mit den Augen ungefähr so breit wie der Halsschild, Stirne an der höchsten Stelle jederseits neben dem Auge mit einem kleinen, ziemlich scharfen Tuberkel versehen, daneben, in der Mitte, zwei breitere, stumpfe, wenig hohe Tuberkel, die weniger durch ihre Grösse als durch die helle Färbung hervorstechen. Fühler ziemlich langgestreckt, 1. Glied fast walzenförmig, 2. knötchenförmig, vom 3. an alle länger als breit, unter sich fast gleich lang. Halsschild fast doppelt so breit wie lang, Seiten fast parallel, Basalecken nur wenig stärker verrundet als die vorderen, Scheibe wenig gewölbt, fast glatt, fein behaart. Flügeldecken in der Mitte, besonders an den Seiten, erloschen punktiert, gegen die Spitzen fast glatt.

Länge: 2·2 mm.

Fundort: South Africa: Worcester, Cape Province, ii.1929 (*leg. R. E. Turner*). Holotype in der Sammlung des British Museum, London.

Durch die mit 4 Tuberkeln versehene Stirne mit keiner der bisher beschriebenen Arten zu vergleichen, provisorisch neben *C. pictifrons* Champ. zu stellen.

Colotes sulcifrons sp. n.

♂. Kopf gelb, Augen und Stirne fast bis zur queren Stirndepression schwarz, Maxillarpalpen gelb mit der äussersten Spitze gebräunt. Fühler schwarzbraun bis auf die 3 ersten Glieder, welche auf der Oberseite mit einer kleinen, teils verschwommenen, dunkeln Makel versehen sind. Halsschild schwarzbraun, Basis ziemlich breit und Vorderrand äusserst schmal gelb bis gelbbraun. Flügeldecken schwarz mit teils blauem, teils violettem Schimmer, Seitenrand von der Basis bis zur Mitte schmal weisslichgelb, die helle Färbung ist unter der Schulter kaum wahrnehmbar. Beine gelb, Basis der Mittelschenkel und Hinterbeine vollständig dunkel.

Kopf (fig. 6) mit den Augen so breit wie der Halsschild, auf der Stirne, am Oberrande der Augen, eine Querdepression, von Auge zu Auge reichend, von der Depression bis zum Clypeus eine glatte, flache Platte, Stirne in der Mitte schwach längseingedrückt. Fühler langgestreckt, 1. Glied lang und dünn, zur Spitze nur wenig verdickt, fast so lang wie Glieder 2 bis 4 zusammengenommen, 2. länglichoval, ungefähr so lang wie das 3., 4. so lang wie das 5. und folgende, jedoch etwas dicker. Halsschild breiter als lang, Seiten fast parallel, von der Mitte zur Basis stark gerundet verengt und mit den Basalecken verrundet, Basalrand und Basalecken leicht erhöht, Scheibe wenig gewölbt, fast glatt, fein behaart. Flügeldecken deutlich, wenig dicht punktiert, fein greis behaart.

Länge: 2·5 mm.

Fundort: South Africa: Worcester, Cape Province, ii.1929 (*leg. R. E. Turner*). Holotype in der Sammlung des British Museum, London.

Eine mit *C. agnatus* Champ. nahe verwandte Art, die einen ähnlich quereingedrückten Kopf hat, mit dem Unterschieddass der Quereindruck bei *agnatus* weiter vorne ist, am Vorderrande der Augen. Auch das letzte Glied der Maxillarpalpen ist bei beiden Arten verschieden, mit einem tiefen Einschnitt auf der Innenseite, vor der Spitze bei *agnatus*, Spitze einfach bei *sulcifrons*.

Colotes planifrons sp. n.

♂. Kopf, inklusive der Mundteile, gelb, Augen und Stirne bis zur Hälfte der Augen schwarz. Fühler schwarz, erste vier Glieder einfarbig gelb. Halsschild gelborange, in der Mitte eine fast rechteckige schwarze Makel, weder den Basal- noch der Vorderrand berührend. Flügeldecken blau, metallisch schimmernd, Seiten von unter den Schultern bis etwas über die Mitte schmal weisslichgelb gesäumt. Beine gelb, nur die Hinterschenkel fast vollständig angedunkelt.

Kopf (fig. 7) mit den Augen ungefähr so breit wie der Halsschild, Stirne einfach, glatt, Clypeus gegen die Oberlippe seicht, breit eingedrückt. Fühler nicht sehr lang, 1. Glied fast walzenförmig, kürzer als das 2. bis 4. zusammengenommen, 2. knötchenförmig, 3. bis 5. unter sich gleich lang und gleich dick, dicker als die folgenden. Halsschild etwas breiter als lang, Seiten gegen die Basis gerundet verengt, Basalecken ziemlich stark verrundet, Scheibe wenig gewölbt, mikroskulptiert. Flügeldecken runzlig gewirkt, dazwischen erloschen punktiert, Behaarung fein.

♀. Fühler in stärkerem Umfange schwarz, meistens nur die ersten 2 Glieder gelb, Halsschildmakel grösser.

Länge: 2·5–2·7 mm.

Fundort: South Africa: Somerset East, Cape Province, ix.1930 (*leg. R. E. Turner*). Holo- und Allotype in der Sammlung des British Museum, London, Paratype in meiner Sammlung.

Sehr ähnlich gefärbt wie *C. buccator* Ab., durch das Fehlen der Aushöhlungen an den Seiten des Kopfes von *buccator* leicht zu unterscheiden.

Illops cavicornis sp. n.

♂. Schwarz, die beiden ersten Fühlerglieder und Schienen orangerot, Halsschild und Flügeldecken orangerot, ersterer mit kleinen medianen schwarzen Makel, letztere mit der Basis, in der ganzen Breite, schmal und einem isolierten Flecken auf jeder Decke, auf der hinteren Hälfte schwarz mit schwachem violettem Schimmer.

Kopf mit den Augen schmäler als der Halsschild, Interokularaushöhlung breit, sich von Auge zu Auge erstreckend, Stirnrand der Aushöhlung fast vollständig einfach, jederseits ungefähr in der Mitte zwischen Augenoberrand und Kopfmitte, schwach erhöht und an dieser Stelle mit ein paar längeren Haaren, ziemlich dicht besetzt, medianer Zahn ausserordentlich breit und stark gebaut, stufenförmig, Clypeus vor dem medianen Zahn mit einem

Querwall, Zwischenraum zwischen dem Wall und dem medianen Zahn schwach vertieft, glatt, vom Querwall bis zur Oberlippe ziemlich grob körnigskulptiert. Fühler (fig. 8) etwas länger als der halbe Körper, 2. Glied nach innen etwas verbreitert, breiter als lang, 3. kürzer als das 4., etwas länger als an der Stpize breit, gegen die Basis konisch verengt, 4. breit, in der Mitte tief eingehöhlt, Basis und Spitze in lange Spitzen ausgezogen, 5. und 6. so breit wie lang, stark nach innen verbreitert und auf der Oberfläche abgeflacht, ziemlich grobkörnig skulptiert, 7. bis 10 normal, 7. etwas länger als das 5., 8. bis 10. in der Länge kaum merklich abnehmend, 10. ungefähr so lang wie das 6., 11. spindelförmig. Halsschild mehr als $1\frac{1}{2}$ mal so breit wie lang, Seiten gegen die Basis stark gerundet verengt, glatt. Flügeldecken nach hinten leicht erweitert, Punktierung sehr grob, etwas erloschen, Behaarung ziemlich dicht, greis, aufstehend.

♀. Unbekannt.

Länge: 3·5 mm.

Fundort: S.W. Africa: Aus, i.1930 (*leg. R. E. Turner*). Holotype in der Sammlung des British Museum, London, Allotype in meiner Sammlung.

Von den anderen Arten der Gattung *Illops* dadurch ausgezeichnet, dass schon das 4. Fühlerglied besonders geformt ist, währenddem bei den bisher bekannten Arten die Fühler erst vom 5. Gliede an besonders geformt sind.

Hedybius aliwalensis sp. n.

♂. Schwarz, mit schwachem grünlichem oder bläulichem Metallschimmer, ausgehöhlter Teil des Kopfes bis zur Oberlippe inklusive, mit Ausnahme von zwei kleinen dunkeln Stellen, an der Basis vor dem medianen Tuberkel, orangegelb, Unterseite des 2. und 3. Fühlergliedes und Schienen ebenfalls sehr oft aufgehellt, Flügeldecken orangerot mit einer fast rechteckigen Makel vor dem Schildchen und einer medianen Makel auf der hinteren Hälfte jeder Decke, an der Naht oft zusammenfliessend.

Kopf (fig. 9) mit den Augen breiter als der Halsschild, Interokularaushöhlung breit, sich von Auge zu Auge erstreckend, medianer Zahn in Form eines flachen, breitgedrückten Tuberkels, Clypeus jederseits neben dem Tuberkel in Form eines stumpfen Zahnes erhöht. Fühler länger als der halbe Körper, vom 4. Gliede an schwach gezahnt, 3. bis 5. Glied unter sich ungefähr gleich lang, 6. eine Spur länger als das 5., 7. bis 10. kaum merklich an Länge zunehmend. Halsschild breiter als lang, Seiten stark gerundet, gegen die Basis verengt, Scheibe fast glatt, gegen die Seiten mit Haarpunkten versehen. Flügeldecken nach hinten kaum verbreitert, ziemlich grob punktiert, Behaarung greis, aufstehend.

♀. Kopf ganz schwarz mit leichtem grünlichem Metallschimmer, zwischen den Augen mit zwei seichten Eindrücken. Fühler kürzer, ebenfalls vom 4. Gliede an schwach gezahnt.

Länge: 3·5–3·8 mm.

Fundort: South Africa: Aliwal North, Cape Province, xii.1922 und i.1923 (*leg. R. E. Turner*). Holotype, Allotype und 1 Paratype in der Sammlung des British Museum, London, 2 Paratypen in meiner Sammlung.

Sehr charakterisiert durch die Zeichnung der Flügeldecken und den breiten Tuberkel in der Interokularaushöhlung, Merkmale welche die neue Art eigentlich mit keiner der bisher beschriebenen vergleichen lässt.

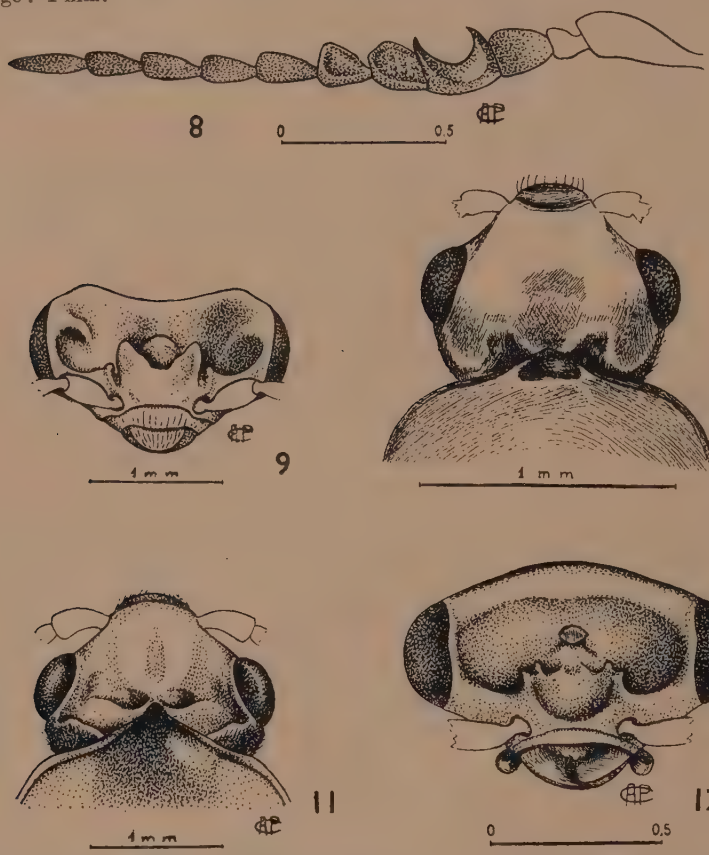
Hedybius (Hedybiinus) ochraceus sp. n.

♂. Gelb, Augen, Schildchen, Mittel-, Hinterbrust und Abdomen schwarz.

Kopf (fig. 10) mit den Augen eher etwas breiter als der Halsschild, mit einem wellenförmigen Einschnitt auf der Stirne, durch den in der Mitte etwas vorspringenden Vorderrand des Halsschildes wird der Einschnitt bei der Ansicht von oben teils verdeckt, sodass es aussieht, als ob die Stirne mit 2 Gruben versehen sei, welche jedoch miteinander

verbunden sind, zwischen den Augen sehr flach eingedrückt, Oberfläche glatt. Fühler sehr kurz, die Halsschildbasis nur wenig überragend, 2. Glied breiter als lang, vom 3. an stumpf, schwach gezahnt, jedes kaum länger als an der Spitze breit. Halsschild breiter als lang, Basalecken viel stärker verrundet als die vorderen Ecken, Vorderrand in der Mitte schwach vorgezogen und an dieser Stelle mit einem schwachen Eindruck versehen, Oberfläche glatt, unbehaart. Flügeldecken fast vollständig glatt, mit vereinzelten aufrechtstehenden Borsten besetzt.

♀. Kopf einfach, Fühler noch kürzer, die Hinterecken des Halsschildes nicht erreichend. Länge: 4 mm.



Figs. 8–12.—(8) Fühler von *Illops cavicornis* sp. n., ♂. (9)–(12) Kopf von: (9) *Hedybius aliwalensis* sp. n., ♂. (10) *H. ochraceus* sp. n., ♂. (11) *Philhedonus vredenburgensis* sp. n., ♂. (12) *P. nigriventris* sp. n., ♂.

Fundort: S.W. Africa: Aus, xi–xii.1929, Okahandja, 13–19.i.1928 und 3–9.ii.1928 (*leg. R. E. Turner*). Holo-, Allo- und Paratypen in der Sammlung des British Museum, London, 2 Paratypen in meiner Sammlung.

Es ist die erste bekanntgewordene Art der Untergattung *Hedybiinus* mit vollständig gelber Oberfläche, Merkmal das sie von allen anderen unterscheidet.

Philhedonus vredenburgensis sp. n.

♂. Schwarz mit grünlichem oder bläulichem Metallschimmer, Kopf vom Hinterrand der Stirnaushöhlung bis und mit Oberlippe bräunlichgelb, Fühler gelblich, manchmal die

Endglieder etwas angedunkelt, Halsschild braungelb mit einer dunkeln, ziemlich grossen Makel am Vorderrand, welche sich bis über die Mitte gegen die Basis erstreckt, Flügeldecken mit je einer queren Makel ungefähr in der Mitte, welche weder den Saum noch die Naht berührt und Spitzen ziemlich breit, rötlich, Vorderschienen grösstenteils, Mittelschienen teilweise aufgehellt.

Kopf (fig. 11) mit den Augen etwas schmäler als der Halsschild, Stirnaushöhlung schmal, sie zieht sich vom oberen Teil des Auges von Auge zu Auge, in der Mitte etwas verdeckt durch den spitz vorgezogenen Halsschild-vorderrand, Stirnrand der Stirnaushöhlung leicht gerundet, erhöht und glatt, in der Mitte schwach ausgebuchtet und mit ein paar Haaren versehen, welche nach innen gerichtet sind, davor zwei seichte, glatte Eindrücke, Clypeus vollständig glatt. Fühler so lang wie der halbe Körper, Glieder stumpf gesägt. Halsschild wenig breiter als lang, Seiten stark gerundet, gegen die Basis etwas stärker verengt als nach vorne, Vorderrand in der Mitte in einem stumpfen Zahn ausgezogen, Spitze etwas dichter mit kurzen, greisen Haaren besetzt als die Scheibe, Oberfläche glatt. Flügeldecken fein, zerstreut punktiert, im basalen Drittel mit vereinzelten Querrunzeln.

♀. Vordere Hälfte des Kopfes braungelb, Halsschildmakel den Vorderrand nicht ganz berührend, einen äusserst schmalen Saum gelblich lassend.

Länge: 3·5 mm.

Fundort: South Africa: Vredenburg, W. Cape Province, 19.xi.1949 (*leg. Borys Malkin*). Holo-, Allo- und Paratypen in der Sammlung der California Academy of Sciences, San Francisco, 4 Paratypen in meiner Sammlung.

Die Art ist sehr nahe mit *Ph. felix* Gorh. verwandt, mit welcher sie gleiche Färbung gemeinsam hat, die Auszeichnungen am Kopfe sind jedoch verschieden, insbesondere fehlt der neuen Art der V-förmige Kiel zwischen den Augen.

Philhedonus nigriventris sp. n.

♂. Oberfläche gelb, nur die Augen, das Schildchen, Mittel-, Hinterbrust und Abdomen, sowie die Hinterbeine schwarz, Fühler vom. 5 oder 6. Gliede an angedunkelt.

Kopf (fig. 12) mit den Augen so breit wie der Halsschild, zwischen den Augen mit einer queren Aushöhlung, in der Mitte eine kleine tuberkelförmige Erhagenheit, Clypeus vom Mitteltuberkel gegen die Oberlippe breit ausgehöhlt, Seitenwände vor dem Tuberkel am höchsten, Spitze leicht ausgerandet. Die Fühler überragen den Halsschildhinterrand, 2. Glied knötchenförmig, 3. so lang wie das 4. Halsschild nur die Hälfte breiter als lang, im vorderen Drittel am breitesten, gegen die Basis stärker als nach vorne verengt, Scheibe leicht gewölbt, glatt. Flügeldecken ziemlich dicht und grob punktiert mit zahlreichen ziemlich dicken, schräg abstehenden Haaren besetzt.

♀. Kopf einfach, Fühler kürzer.

Länge: 3–4 mm.

Fundort: S.W. Africa: Okahandja, xii–ii.1927/28 (*leg. R. E. Turner*). Holo-, Allo- und Paratypen in der Sammlung des British Museum, London, Paratypen in meiner Sammlung.

Aufgrund der 4-gliedrigen Vordertarsen beim ♂ vorläufig in die Gattung *Philhedonus* gestellt. Die Form der Interokularaushöhlung deutet jedoch eher zu *Troglops*, wovon sie aber wieder abweicht durch die ziemlich stark punktierten Flügeldecken mit der groben Behaarung. Von den übrigen *Philhedonus*-Arten leicht durch die gelbe Oberfläche zu unterscheiden.

Dasytidae.

Pagurodactylus pseudoangustissimus sp. n.

♂. Schwarz, Wangen, Unterseite des 1. Fühlergliedes und manchmal auch 2. bis 4. Glied aufgehellt, Vorderrand des Halsschildes äusserst schmal, Basalrand und Seiten an der Basis bis ungefähr 2/5 der Länge, wo der Seiteneindruck aufhört, die ganze Naht der

Flügeldecken um die Spitzen herum und an den Seiten entlang bis unter die Schulterbeulen, schmal gelb gefärbt. Vorderschienen manchmal auch etwas aufgehellt.

Kopf ziemlich langgezogen, schmäler als der Halsschild, feinstens chagriniert, dazwischen zerstreut mit einigen Punkten besetzt, Stirne zwischen den Augen schwach längseingedrückt. Fühler den Halsschildhinterrand etwas überragend, 3. Glied so lang wie das 4., folgende von etwa gleicher Länge, jedoch dicker. Halsschild deutlich länger als breit, Seiten fast parallel, nach vorne kaum wahrnehmbar verengt, Mittellinie deutlicher in der vorderen Hälfte als in der basalen, vor dem Basalrand mit einer kräftigen Querfurche, welche sich auf den Seiten bis etwa 2/5 der Länge hinzieht, Oberfläche feinstens chagriniert, dazwischen mit einigen zerstreuten Punkten. Flügeldecken fein erloschen gewirkt, matt, äusserst fein anliegend, kurz, nicht sehr dicht und länger abstehend, behaart.

♀. Halsschild und Fühler kaum kürzer als beim ♂.

Länge: 3·5–5 mm.

Fundort: South Africa: Somerset East, Cape Province, xi–xii.1930 (*leg. R. E. Turner*). Holo-, Allo- und Paratypen in der Sammlung des British Museum, London, Paratypen in meiner Sammlung.

Im ersten Augenblick glaubt man grosse Exemplare von *P. angustissimus* Pic vor sich zu haben, mit denen die neue Art zum Verwechseln ähnlich ist. Sie unterscheidet sich durch den etwas längeren Halsschild, der weniger dicht und tief punktiert ist und die Flügeldecken, welche deutlich, doppelt behaart sind. Bei *angustissimus* ist der Halsschild dicht punktiert und die Flügeldecken praktisch unbehaart.

Pagurodactylus parallelus sp. n.

Einfarbig schwarz, nur die Vorderscheinen, manchmal auch die Vorderschenkel gegen die Spitze auf der Innenseite und die Fühler vom 2. bis 5. Gliede an, gelb. Ein Exemplar hat vollständig helle Fühler und auch die Wangen sind aufgehellt.

Kopf länger als breit, mit den Augen schmäler als der Halsschild, Stirne schwach längsgefurcht, von der Mitte der Augen an bis zur Oberlippe breit eingedrückt, Punktierung zerstreut, tief, dazwischen fein mikroskulptiert. Fühler kurz, alle Glieder gegen die Spitze, etwas mehr nach innen als nach aussen hin verdickt, 2. Glied kaum kürzer als das 3., 3. so lang wie das 4., folgende kaum merklich kürzer werdend. Halsschild etwas länger als breit, in der Mitte am breitesten, von dort nach beiden Seiten hin schwach konisch verengt, nach vorne etwas stärker als gegen die Basis. Mittelfurche deutlich und tief, in der Mitte weniger tief als kurz vor der Basis und vorne, Seitenfurche basal ausserordentlich scharf und tief eingezeichnet, fast bis zur Mitte reichend, an der Basis weniger tief gegen das Schildchen fortgesetzt und bevor die Mitte der Basis erreicht ist, ganz erlöschend, Punktierung und Mikroskulptur wie beim Kopf. Flügeldecken lang, fast, parallel, nach hinten kaum erweitert, fein chagrinartig gerunzelt, Behaarung spärlich, halb aufstehend. Die vorliegenden. Exemplare scheinen alle ♀ zu sein.

Länge: 4 mm.

Fundort: South Africa: Johannesburg, 17.ix.1905. Holo-, Allo- und 2 Paratypen in meiner Sammlung, Paratype in der Sammlung des British Museum, London.

Die Art ist mit *P. funereus* Champ. verwandt, ist aber grösser und durch die gelben Vorderschienen leicht zu erkennen. Herr J. Balfour-Browne hatte die Freundlichkeit die Art mit den Typen von *P. lugens* Gorh. und *funereus* Champ. zu vergleichen und mir wie folgt darüber zu schreiben: "I have made an immediate comparison with the types of *lugens* Gorh. and *funereus* Champ. and there is not the slightest doubt that it is neither of these two species, which have a proportionately less elongate pronotum without the median longitudinal sulcus and without microreticulation."

NOTES ON SOME SPECIES OF *DYSAPHIS* BÖRNER, 1931 (HEM., APHIDIDAE).

By H. L. G. Stroyan, M.A., F.R.E.S.

As a result of correspondence with Prof. E. O. Essig of Berkeley, Cal., and Dr. Hille Ris Lambers of Bennekom, Holland, and also of an examination of certain material in the collections of the British Museum (Natural History), it seems desirable to try and straighten out the identities and synonymies of some species of the genus *Dysaphis* Börner, which are at present in a state of some confusion.

Theobald (1922) described a species of *Dysaphis* from " Fennel " under the name *Anuraphis foeniculus* sp. n. The type material, which consisted solely of apterae, was collected at Gizeh, Egypt, on 25.iv.1918. In the same paper he described another *Dysaphis* as *Anuraphis apiifolia* sp. n., the types of which were alate and were collected from *Apium graveolens* at Gizeh on 17.iii.1918.

Essig (1938) described a species of *Dysaphis* from California as *Aphis ferruginea-striata* sp. n. The type material was taken on *Conium maculatum*, and additional host records were cited from *Apium graveolens*, *Anethum graveolens*, *Foeniculum vulgare*, *Petroselinum sativum* and cultivated carrot.

Hall (1926) published a supplementary account of the alate viviparous female of *A. foeniculus* from fennel and *Anethum*, and a similar account of the apterae of *A. apiifolia* from celery and fennel.

Hille Ris Lambers (1948) in a note on *Sappaphis angelicae* (Koch) wrote: " It is probably the same species as that described as *Anuraphis foeniculum* (*sic*) Theobald, and *Aphis ferruginea-striata* Essig, found on *Apium* in California, is also a synonym of *angelicae* Koch according to material from Prof. Essig."

Börner (1950, 1952) refers to a species *Yezabura inculta* (Walker), with three subspecies: *inculta* s.s., migrating from *Crataegus* to *Apium*, ssp. *petroselini* C.B. living in summer on *Petroselinum sativum*, and ssp. *nudicaulium* C.B. living in summer on *Levisticum*, with an ability to use *Conium maculatum* as a reserve host.

I have now been able to examine the Theobald and Essig type material of *foeniculus*, *apiifolia* and *ferruginea-striata*, and to compare it with European material of *angelicae* (Koch) and *inculta* (Wlk.) sensu Börner 1950. The picture which emerges, which is coherent and consistent, is summarised hereafter.

1. *Dysaphis angelicae* (Koch).

This species, which is common in Europe as a whole, is heteroecious between *Crataegus*, on which it forms red twisted leaf galls in spring like those of *crataegi* (Kalt.), and *Angelica sylvestris*. It has the following morphological characters:

Apterae: longest hairs on ant. III 27μ to 55μ in length.
,, ,, abd. 3T 26μ to 65μ ,,
Marginal tubercles on 7th abd. tergite almost always absent, but a single one occurs in about 1 per cent. of individuals.

Alatae : longest hairs on ant. III 14μ to 25μ in length.
,, ,, abd. 3T 22μ to 36μ ,,
Secondary rhinaria on antennal joints :

III.	IV.	V.
46–87	13–37	0–17 (very rarely less than 2).

Apical joint of rostrum (both forms) from 0·15 to 0·19 mm. long, in the great majority of specimens between 0·16 and 0·18 mm.

Material examined : 124 apterae and 97 alatae, from *Crataegus* and *Angelica* in localities in Holland (1), Cambridgeshire (3), Surrey (1) and Dorset (1) ; all in my collection.

2. *Dysaphis apiifolia* (Theobald).

The majority of the characters given by Theobald (1922) and Hall (1926) are irrelevant to this discussion, as being typical of the genus *Dysaphis* as a whole. Theobald, however, gives the numbers of secondary rhinaria on the antennal joints of the alata as III 68–75, IV 20–24, V 0–4, and mentions that the structure and arrangement of these give the third and fourth joints a densely tuberculate appearance. Hall further describes the abdominal tubercles of the apterae as large and rather conspicuous. Examination of the type material of *apiifolia* in the British Museum at the instance of Mr. J. P. Doncaster showed that the antennal and dorsal body hairs of the species are extremely short and blunt, not more than 8–9μ in length, and that a number of alatae show a rather typical shape of the dark dorsal patch on the abdomen, which narrows rather evenly from its widest point a little before the siphunculi to its anterior limit on the 3rd abdominal segment. All the above characters serve to identify *apiifolia* with the celery-infesting species called by Börner *inculta* (Walker).

3. *Dysaphis ferruginea-striata* (Essig).

The description of this species, made from material collected on *Conium maculatum* at Berkeley, California, in Sept.–Oct., 1934, like that of *apiifolia* Theobald, contains little information which can be used diagnostically to separate the species from other *Dysaphis*. However, the figures of the aptera and alata indicate clearly that the type material is of a species with very short antennal hairs, and that the abdominal marginal tubercles are conspicuous and often present also on the 7th abdominal tergite. These details have been confirmed by examination of type material from *Conium* in the collection of the British Museum. From this material it was also established that in at least some alatae the dorsal abdominal patch was characteristically narrowed anteriorly in the manner already described under *D. apiifolia*. The numbers of secondary rhinaria on the antennae of the alatae are given in the description as III 64–75, IV 13–26, V 0–5, with the additional note : " The sensoria are so crowded over the whole of segment III that they are extremely difficult to count, so that these figures are only approximately correct."

The above characters, like those of *D. apiifolia*, agree in such detail with the diagnostic features of *D. inculta* (Walker) from Europe that there can be little doubt that the type material of *ferruginea-striata* is that species. There remained the problem of the aphids which had caused Hille Ris Lambers to

suggest synonymy with *D. angelicae* (Koch). Following a letter written to Prof. Essig I received the following information from him ; he writes : " This has caused me to more critically examine my specimens and to look upon them in a new light. As a result I found that what I described as the above (*D. f-s.*) appears to be mostly limited, in my collections, to poison hemlock, *Conium maculatum* L., which is widely distributed in this district, covering large areas. What appears to be this species was also reared on celery in the greenhouse and occurs in celery fields in southern California. This species has very short antennal hairs and seems to check with your description of *S. inculta* (Walker), which is not represented in my collection. . . . Also provisionally grouped with *S. ferruginea-striata*, in my collection, were a considerable number of slides of another species, which occurs commonly on cultivated carrots. Upon examination, I find this may possibly be *angelicae* (Koch) because it has much longer antennal hairs. . . . It is possible that I may have also sent a slide of this latter species to Lambers."

Following this letter I was able to obtain the loan of a slide in Dr. Hille Ris Lambers' collection, and found that it was in fact a sample from cultivated carrot collected at Oakland, California, in 1942. The aphids on this slide belonged to two species : one aptera of the common European carrot species *Dysaphis crataegi* (Kaltenbach) and two apterae and three alatae of a second species with fairly long and rather acute antennal and body hairs, very short siphunculi and relatively few secondary rhinaria on the antennae in the alatae. The morphological details of this material were as follows :

Apterae : longest hairs on ant. III 25μ to 30μ in length.
,, ,, abd. 3T 33μ ,,
Processus terminalis 2·20 to 2·27 times base of VI.

Alatae : longest hairs on ant. III 14μ to 19μ in length.
,, ,, abd. 3T 21μ to 26μ ,,
Secondary rhinaria on antennal joints :

III.	IV.	V.
25–34	5–9	0

Processus terminalis 2·75–3·00 times base of VI.
Apical joint of rostrum (both forms) 0·14 mm. long.
Marginal abdominal tubercles in both forms very small, absent from 7th abdominal tergite.
Abdominal dark patch in alatae large, anterior margin not markedly narrowed.

The foregoing characters agree in detail with those of the North African *D. foeniculus* (Theobald). It is considered that in addition to the carrot material (which may be to a greater or less extent *D. crataegi* (Kaltenbach)) the Californian records from *Anethum graveolens* and *Foeniculum vulgare* will be referable mainly to *foeniculus*, although Hall (1926) records material of *apiifolia* Theobald (*inculta* Walker, *ferruginea-striata* Essig s.s.) collected on fennel in Egypt.

4. *Dysaphis foeniculus* (Theobald).

The original description of apterae of this species contains few diagnostic characters. The processus terminalis is described as about 3 times base of VI. Hairs on the first three antennal joints are described as " rather long,"

and the abdomen is said to have numerous short, rather stiff hairs, small lateral papillae and small dusky pigmented areas. The cornicles are said to be short, about as long as the fourth antennal joint.

The description of the alata by Hall (1926) contains figures for the secondary rhinarial numbers on the antennal joints. They are, III 30–38, IV 2–9, V 0; reference is also made to the marked large dorsal patch, which is characteristic of *foeniculus* when compared with *D. tulipae* (B. de F.), its closest morphological relative.

Examination of the material of Theobald's North African collections in the British Museum, and comparison with Hall's alatae of *foeniculus*, show that no fewer than three collections of this species, from three different hosts, are represented. The third sample, taken by Theobald at Sidi Yahia des Zaers, Algeria, in March, 1929, was for some reason labelled by him partly with the name *Anuraphis padi* L. (his name for *Brachycaudus helichrysi* (Kaltenbach)) and partly as *Dentatus ferulae* Nevsky. The host plant in this instance was *Ferula*, and I presume that Prof. Theobald at first named the sample *padi*, and then later on encountering Nevsky's description, published in 1929, ascribed other slides from the same sample to *ferulae* without altering the earlier labels.

The morphological characters of *foeniculus*, compiled from the published data and from study of the British Museum material, are as follows:

Apterae: longest hairs on ant. III 25μ in length.
,, ,, abd. 3T 43μ ,,
Alatae: longest hairs on ant. III 12μ to 14μ in length.
,, ,, abd. 3T 18μ to 26μ ,,
Secondary rhinaria on antennal joints:

III.	IV.	V.
30–39	2–10	0

Apical joint of rostrum (both forms) 0·14 mm.

Marginal abdominal tubercles in both forms small, and not present on abd. 6 or 7.

Dorsal abdominal dark patch in alatae large, solid, not markedly narrowed anteriorly, hardly separated from the marginal sclerites laterally.

Processus terminalis in aptera about 2·80 times base of VI, in alatae 2·71 to 3·23 times base of VI.

Material examined: type material (apterous) and morphotypes (alate) from *Foeniculum* and *Anethum*, Gizeh, Egypt, 25.iv.18 and 2.iii.21; and sample from *Ferula* (apterae and alatae), Sidi Yahia des Zaers, Algeria, March, 1929. All in the collections of the British Museum (Natural History).

5. *Dysaphis inculta* (Walker).

Walker (1849) described only the oviparous female of this species, taken on *Apium* at Fleetwood, Lancs. Börner (1950, 1952) describes the species which he calls *inculta* as heteroecious from *Crataegus* to celery, parsley, *Levisticum* and *Conium*. It would therefore appear doubtful whether the species he regards as *inculta* can in fact be Walker's species, since the oviparae of Börner's aphid must be produced on *Crataegus*. Walker's description is very vague, and could apply to the oviparae of any one of many species of aphids. *Dysaphis inculta* as here described is the species so interpreted by Börner; but if this interpreta-

tion is rejected the first available name becomes *apiifolia* Theobald, which, together with *ferruginea-striata* Essig, Börner rightly considered to be synonyms of his *inculta*.

The heteroecy of this species between *Crataegus* and Umbelliferae was tested by Börner (1947–49) and Stroyan (1951). Red galls are formed on the leaves of *Crataegus* in spring in central and western Europe ; but in north Africa and California it would seem that the life-cycle is anholocyclic, aphids being found on celery, fennel or *Conium* at times of year which preclude migration. The phenomenon of anholocycly over part of the range of an aphid is by no means exceptional, and in the genus *Dysaphis* it would seem that *D. radicola* (Mordv.) also exhibits it.

The morphological characters of *inculta* (sensu Börner), taken from British material, are as follows :

Apterae : longest hairs on ant. III 7μ to 14μ in length.
,, ,, abd. 3T 7μ to 13μ ,,
Alatae : longest hairs on ant. III 7μ to 13μ in length.
,, ,, abd. 3T 7μ to 13μ ,,
Secondary rhinaria on antennal joints :

III.	IV.	V.
61–80	23–32	0–9

Apical joint of rostrum (both forms) 0·15 to 0·18 mm. long.

Marginal abdominal tubercles rather conspicuous, flattish, in many instances a pair present on the 7th tergite, only comparatively rarely without at least one on this segment.

Dorsal abdominal dark patch in alatae often rather broken anteriorly, and characteristically narrowed towards the anterior margin, though this is not a constant feature.

Material examined : 53 apterae and 15 alatae, from *Crataegus*, *Apium*, *Petroselinum* and *Smyrnium olusatrum* in localities in Kent (1), Herts. (1) and Cambridgeshire (2) ; all in my collection.

Taxonomic Discussion.

The various *Dysaphis* forms described in the foregoing pages can be grouped into three well-defined species with distinct morphological and biological characteristics. *Dysaphis angelicae* (Koch) despite contrary suggestions is almost certainly restricted to *Angelica sylvestris* and perhaps also *archangelica* as summer hosts, with a primary host association with *Crataegus*. Also associated with *Crataegus* in Europe is *D. inculta* (Walker) of Börner, 1950 (? = *apiifolia* (Theobald)) ; this species lives in summer on *Apium*, *Petroselinum* and *Levisticum*, and may also colonise *Smyrnium*, *Conium* and *Foeniculum*. It appears to be anholocyclic in Africa and the United States. Finally *D. foeniculus* (Theobald), which is probably uniformly anholocyclic, lives in North Africa and in California on *Foeniculum*, *Anethum*, *Ferula* and cultivated carrots ; the last-named host may have been acquired recently in California as a result of favourable ecological conditions. *D. foeniculus* is not yet described from Europe, but it is possible that *D. laserpitii* (Börner, 1950) may be closely related. *Dentatus ferulae* Nevsky I do not at present know, but if synonymous with *foeniculus* would in any event sink under the rule of priority. The synonymy of these forms is as follows :

Genus : *Dysaphis* Börner, 1931, Type species *Dysaphis angelicae* Börner 1931 *nec* (Koch, 1854) (= *D. anthrisci* Börner, 1950).
Synonyms : *Dentatus* Van der Goot, 1912, preocc.
Yezabura Matsumura, 1917 (Börner, 1930), ? *nec* Mats.
Species : *angelicae* (Koch, 1854), *nec* Börner, 1931.
inculta (? Walker, 1849), Börner, 1950.
syn. *ferruginea-striata* (Essig, 1938).
apiifolia (Theobald, 1922).
foeniculus (Theobald, 1922).
syn. *ferruginea-striata* (Essig) H.R.L., 1948.
angelicae (Koch) H.R.L., 1948, *partim.*

The following keys will serve to distinguish the three species :

1. *Apterae.*

1 (2) Longest hairs on ant. III from 7 to 14μ in length, on 3rd abdominal tergite from 7 to 13μ . . . . . **inculta**? Walker
2 (1) Longest hairs on ant. III more than 20μ in length, on 3rd abdominal tergite more than 25μ .
3 (4) Siphunculi from 0·14 to 0·15 mm. in length, and $1\frac{1}{2}$ to $1\frac{3}{4}$ times as long as cauda . . . . . **foeniculus** Theobald
4 (3) Siphunculi from 0·16 to 0·27 mm. in length, and $1\frac{3}{4}$ to $2\frac{3}{8}$ times as long as cauda . . . . . **angelicae** Koch

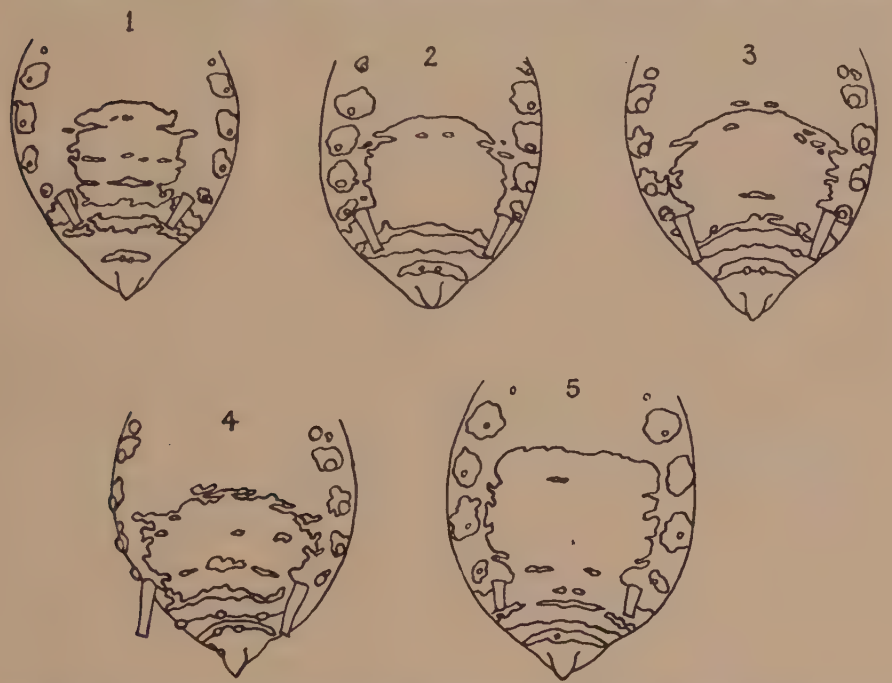
2. *Alatae.*

1 (2) Secondary rhinaria on ant. III 25 to 39 in number, on ant. IV 2 to 10 **foeniculus** Theobald
2 (1) Secondary rhinaria on ant. III more than 40 in number, on ant. IV more than 12.
3 (4) Longest hairs on ant. III and 3rd abdominal tergite 7 to 13μ in length. Marginal tubercles present on 7th tergite in a majority of specimens . . . . . **inculta**? Walker
4 (3) Longest hairs on ant. III 14 to 25μ in length, on 3rd abdominal tergite 22 to 36μ. Marginal tubercles rarely present on 7th tergite, and only exceptionally paired . . . . . **angelicae** Koch

This key does not take into account the question of *Dysaphis tulipae* (B. de F.), which lives anholocyclically on a large variety of Monocotyledons. *D. tulipae* is very close morphologically to *D. foeniculus*, and its biometric characters overlap to a considerable extent with those of *foeniculus*. I am at present unable to indicate a character which will effectively separate the apterae of the two species, though this is unlikely to be of importance in view of the fact that apterae are nearly always collected in association with their host plants. The alatae of *tulipae* may be distinguished as a rule from those of *foeniculus* by the much less extensive black abdominal patch on the dorsum. There is also a higher average number of secondary rhinaria on the third antennal joint, though the overlap is considerable. A series of diagrammatic figures is given showing the typical form of the dorsal abdominal patch in the various species discussed here.

A word may be said about the use of the generic name *Dysaphis* Börner. There is in my opinion a good case for the separation of this group of species,

with genotype *anthrisci* Börner 1950, from the genus *Sappaphis* Matsumura, genotype *S. piricola* Okamoto and Takahashi (nom. nov. pro *S. piri* Mats., 1918, homonym of *S. pyri* (Fonsc., 1841) nec *Aphis pyri* Kittel, 1827). I can however see no justification for separating the group of species with apple as primary host, and whose oviparae have 3 nymphal stadia, from the group using *Crataegus* as primary host, and whose oviparae have only 2 nymphal stadia. This practice has been initiated by Börner (1950), who applies his name *Dysaphis* to the first group and *Yezabura* Mats., type species *Y. sasae* Mats., to the second. The chief objection to this practice is that the morphology of the viviparae is such that it is impossible to decide by morphological examination to which group any one species should belong ; and in the case



Figs. 1–5.—Diagrams of typical shapes of dorsal abdominal patch in alatae of (1) *Dysaphis tulipae* (B. de F.), (2) *D. angelicae* (Koch), (3) and (4) *D. inculta* (? Walker), (5) *D. foeniculus* (Theobald).

of anholocyclic species such as *foeniculus* Theob. this impossibility would seem to be permanent ! If the two groups are treated as one genus the problem arises which of the two genera used by Börner is the correct one. *Yezabura* is older by 14 years, but it is very doubtful whether *Y. sasae*, living on the grass *Sasa paniculata*, has really anything to do with the *Dysaphis* group. I have therefore elected here to use the name *Dysaphis*, the application of which is not in doubt.

Economic Importance.

Of the three species principally discussed, it is possible to exonerate *D. angelicae* (Koch) from any suspicion of causing damage of economic importance

to man. It would seem, however, that both *D. inculta* (? Walker) and *D. foeniculus* (Theobald), apart from their importance to culinary herbs such as parsley, dill and fennel, may be possible sources of damage and loss of more important crops such as carrots and celery in those climatic regions where they are predominantly anholocyclic. In these areas there would appear to be ample reservoirs of infestation for these species in the wild populations of *Conium*, *Foeniculum* and *Anethum*, which in California are known, on Prof. Essig's authority, to be very large.

Acknowledgments.

Very many thanks are due to Prof. E. O. Essig and Dr. D. Hille Ris Lambers for placing at my disposal the necessary material and information to solve the problem of the identities of the aphids concerned; and also to Mr. J. P. Doncaster of the British Museum (Natural History) for showing me the type and cotype material in the Museum's collections.

References.

Börner, C., 1950, *Neue europäische Blattlausarten*. Naumburg, Saale.

——, 1952, Europae Centralis Aphides (Die Blattläuse Mittel-europas). *Mitt. Thüring. bot. Ges.* **4**, Beiheft **3** : 1–259.

Essig, E. O., 1938, Aphids feeding on celery in California. *Hilgardia* **11** : 459–492.

Hall, W. J., 1926, Notes on the Aphididae of Egypt. *Bull. Minist. Agric. Egypt* **68** : 57

Hille Ris Lambers, D., 1948, On Palestine Aphids, with descriptions of new subgenera and new species. *Trans. R. ent. Soc. Lond.* **99** : 269–289.

Koch, C. L., 1854, *Die Pflanzenläuse, Aphiden*.

Theobald, F. V., 1922, New Aphididae found in Egypt. *Bull. Soc. Roy. ent. Egypte* **7** : 39–80.

Walker, F., 1849, Descriptions of Aphides. *Zoologist* **7**, *Suppl.* xliii.

A NEW LITTORAL *PROISOTOMA* (COLLEMBOLA, ISOTOMIDAE) FROM THE CLYDE AREA.

By D. H. Murphy.

(*Department of Zoology, Durham Colleges in the University of Durham.*)

Proisotoma (Proisotoma) admaritima sp. n.

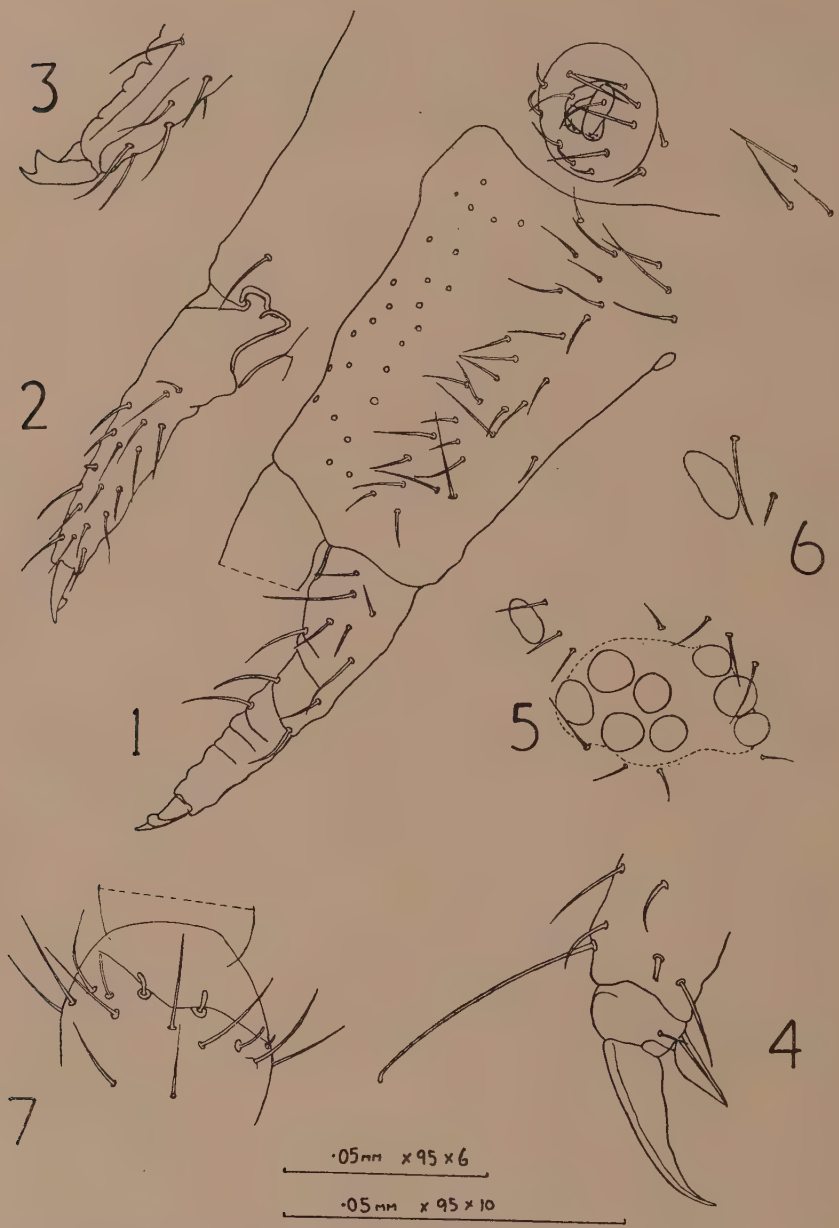
Manubrium with 1 : 1 ventral subapical setae and dorsally with 18 to 25 per side with a median-dorsal naked field between. Dens slightly shorter than the manubrium, with 6 to 10 large, irregular crenulations in the middle part. Mucro bidentate, without lamellae, the anteapical tooth stronger than the apical. Claws without teeth. Tibiotarsus apically with a single, clavate tenent hair. Ocelli 8 : 8.

Taxonomic affinity.—The species falls as a true *Proisotoma* s. str. in any of the modern published classifications of the group on account of the relatively short thick dens with few setae. It is not a borderline case in any character except perhaps, in the fusion of the last two abdominal segments. It comes closest to *tenella* Reuter, from which species, however, it is abundantly distinct in the 1 : 1 ventral manubrial setae, in the relative lengths of the segments of the furca and in the irregular and few dorsal crenulations of the dens. The mucro is similar but rather shorter and stouter. Tenent hair, as in *tenella*, is single, but it is distinctly clubbed and usually slightly hooked, whereas Stach illustrates *tenella* as having a triangular spathulate tip.

Size (largest specimen)= 1·32 mm. Colour deep blue-black in life; in alcohol, pale oval spots visible on the head; appendages paler than body. Cuticle smooth, showing, in surface view, a minute regular punctuation visible only under high magnification, and is certainly to be regarded as smooth for the purpose of comparison with *revilliodi* and *curva* Gisin, which are described as "uniformly granulate." Body clothed with rather sparse, moderately short setae; no outstandingly long ones on any segment, but becoming rather longer towards the apex of abd. 6. All setae smooth and pointed. Relative lengths of antennal joints I : II : III : IV in type as 8 : 11 : 11 : 21 (8 : 10 : 11 : 20); relative length of antenna to head diagonal variable; even when apparently fully extended it may be from $\frac{3}{4}$ to $1\frac{1}{4}$ the head diagonal in different specimens. S.O. Ant III typical, with two lightly curved sense rods exposed freely, and at a little distance on each side two slender blunt sensory hairs (fig. 7). Ant. IV with only a shallow, indistinct subapical pit; in addition to the normal setae a number of short acuminate conical setae around apex. Head from above about as long as broad; ocelli 8 : 8, not markedly different in size, and situated on a common black eye-patch (fig. 5). PAO 1·2 to 1·4 the diameter of an ocellus in length, broadly elliptical and only very slightly constricted, without border or listel (figs. 5, 6). Body proportions much as in *tenella* with relative lengths of segments Th. ii and iii, Abd. 1 2 3 4 and 5–6 as 40 : 35 : 28 : 28 : 26 : 30 : 25, measured along the mid-tergal line. Segments 5 and 6 fused in the dorsal line but a division can be seen laterally. Claw with no inner or lateral teeth. Empodial appendage slightly longer than half length of inner edge of claw, untoothed, with a strong inner lamella and a very narrow outer one; pointed, but not prolonged into a terminal bristle. Tibiotarsus with a single, distinctly clavate tenent hair, generally slightly curved at tip (fig. 4).

Tenaculum with 4 : 4 barbs on rami and a single, strong, anteromedian seta on corpus.

Furcula (figs 1–3) rather short, of normal *Proisotoma* dimensions, reaching only to middle of abd. seg. 2. Manubrium ventrally with 1 : 1 strong, subapical setae; dorsally some-



Figs. 1–7 (1) Dorsal chaetotaxy of furca and gonopore of type. Obj. 95, oc. 6. (2) Ventral chaetotaxy of furca of type (by transparency). Obj. 95, oc. 6. (3) Mucro and distal part of dens from side, paratype. Obj. 95, oc. 10. (4) Left hind foot of type. Obj. 95, oc. 10. (5) Eye group and PAO (right side), type. Obj. 95, oc. 6. (6) PAO (right side), paratype. Obj. 95, oc. 10. (7) Sense organ of antennal joint III, left, antenna of type. Obj. 95, oc. 10.

what variable even among apparently mature individuals, with two quite distinct groups of 18 to 25 setae, i.e., having these setae rather laterally on the dorsal face and separated by a median, longitudinal naked field (in young individuals this number is reduced). Halfway along manubrium, situated on side and projecting laterally, a single small seta, isolated from the others. Manubrium narrowing slightly to the end and a little longer than dens. Dens rather short and stout, narrowing distally to about a fourth of its basal width ; armed ventrally with about 15 setae (this number varies with size), concentrated at distal end of dens, and distally formed into transverse rows of two or three ; proximally sparse and irregular, basal region being usually naked. Dorsally dental setae fewer and concentrated in the proximal part. A proximal diagonal row of three, the median strongest, then a single median one often accompanied by another on the inside. Distal to this are two, or more usually three pairs of strong spreading setae, regularly spaced ; the last pair very strong and situated about one-third from the end ; distal third of dens dorsally naked. Entire dorsal surface very irregular and in middle part crenulate with 6 to 10 large, ill-formed crenulations. Mucro bidentate, without lamellae, with a large strong, triangular ante-apical tooth and a weaker, curved apical one ; about one-sixth length of dens. Manubrium : dens : mucro as 23 : 21 : $3\frac{1}{2}$ in the type (a fairly constant proportion).

Scotland : Isle of Cumbrae, Millport, Keppel pier, near Meteorological Station.

On surface of rock pools in splash zone, and about high-water mark, spring tides.

Types ; Holotype and paratypes in British Museum Collection ; paratypes in H. Gisin Coll., J. T. Salmon Coll., and D. H. Murphy Coll.

Acknowledgments.

I am deeply indepted to Dr. H. Gisin of the Musée d'Histoire naturelle, Geneva, for his advice and helpful criticism, to Miss T. Clay of the British Museum (Nat. Hist.) and to Dr. J. T. Salmon of Victoria University College, Wellington, NZ. My thanks are also due to the authorities of the British Museum (Nat. Hist.) for facilities for study.

References.

Gisin, H., 1944, Hilfstabellen zum Bestimmen der Holarktischen Collembolen. *Verh. naturf. Ges. Basel* **55**: 1–130.

——, 1949, Notes sur les Collemboles avec description de quatorze espèces et d'un genre nouveau. *Mitt. Schweiz. ent. Ges.* **22** : 385–410.

Salmon, J. T., 1951, Keys and Bibliography to the Collembola. *Zool. Publ. Victoria Univ., N.Z.*: **8**.

Stach, J., 1947, *The Apterygote Fauna of Poland in relation to the World Fauna of this Group of Insects. Family Isotomidae.* Pol. Acad. Sc. and Lett., Cracow, pp. 1–488.

A CHANGE OF NAME AMONG THE BRITISH MOSQUITOES. (DIPTERA, CULICIDAE).

By P. F. Mattingly, B.Sc., F.R.E.S.

Bohart (1948), in revising the North American *Neoculex*, has discussed the difficult synonymy of *Culex* (*Neoculex*) *territans* Walker and has distinguished this species from *C.* (*N.*) *apicalis* Adams. I am in agreement with his conclusions. It appears that *Culex apicalis* is restricted to California and Arizona, while *Culex territans* is widely distributed from Texas to Alaska.

Differences between the two species noted by Bohart may be tabled as follows :

	C. territans.	*C. apicalis.*
Adult ♂.		
Length of row of long setae at apex of "long" segment of palp relative to length of terminal segment of palp.	Nearly equal.	Not more than half.
Combined length of last two segments of palp relative to length of proboscis.	Slightly more than half.	Slightly less than half.
Bridge connecting lobes of mesosome.	Sclerotized.	Membranous and unpigmented.
Basistyle (coxite).	Moderately constricted at middle.	Strongly constricted at middle.
Hooked setae of subapical lobe of coxite.	Subequal.	Basal longer.
Smaller setae of subapical lobe.	Five in number.	Six in number.
Dististyle (Style).	With numerous microsetae and a row of membranous lobes.	Without microsetae or membranous lobes.
Adult ♀.		
Palp.	About twice as long as flagellar segment IV.	About three times as long as this segment.
Upright forked scales of vertex.	Light brown to medium brown.	Pale to light brownish.
Thoracic integument.	Usually a rather light brown.	Brown to dark brown.
Scutal scales.	Generally coppery, sometimes with a paler discal spot or pale lines.	Greyish, somewhat shaggy, sometimes forming a central line and a curved lateral line.

Hind femur.	Pale ventral stripe complete.	Pale ventral stripe interrupted near apex.
Larva.		
Antenna.	Constricted at apical third.	Constricted at apical fourth.
Head seta " C."	Usually single, up to $\frac{3}{4}$ as long as " B."	Double or triple, about $\frac{1}{2}$ as long as " B."
Head seta " B."	Usually single.	Usually double.
Submedian mesothoracic seta (seta 1).	At most $\frac{1}{3}$ as long as antennal shaft, double to quadruple.	About $\frac{1}{3}$ as long as antennal shaft, usually double.
Thoracic integument.	Moderately pilose at 100 magnification.	Densely pilose at 100 magnification.
Submedian hairs of first two abdominal tergites.	Single or double.	Single to triple.
Siphonal index.	Usually 6–7.	7–8.
Basal tufts of siphon.	Usually pentad, $\frac{1}{5}$–$\frac{1}{3}$ siphonal length.	Usually quadruple $\frac{1}{7}$–$\frac{1}{5}$ siphonal length.
Pecten.	Usually on basal $\frac{1}{3}$ of siphon, middle tooth usually tridentate.	On basal $\frac{2}{5}$ of siphon, middle tooth with about 4 denticles.
Saddle hair.	Double to quadruple, very slender.	Usually double and fairly strong.
Anal papillae.	Usually somewhat shorter than saddle, but may be up to twice as long as saddle.	Usually shorter than saddle.
Pupa.		
Abdominal tergite II.	Submedian hair-tuft at apex with branches split into 15–20 twiglets.	Submedian hair-tuft with 7–8 undivided branches.

The British specimens of *Neoculex* available to me (1 incomplete ♂ adult with associated larval and pupal pelts from Hayling Island, 1 ♀ adult from Aviemore, Inverness, and 8 ♂ and 16 ♀ adults from the Ambleside area) agree with *territans*, differing from the above description only in the following particulars :

Row of long setae on ♂ palp varying from about $\frac{1}{3}$ the length of the terminal segment to nearly equal to this length ; style with microsetae scanty or absent ; thoracic integument usually fairly dark brown ; head setae " B " and " C " missing ; submedian mesothoracic seta not identified with certainty owing to crumpling of the pelt, but apparently a little more than $\frac{1}{3}$ the length of the antenna ; proximal subventral tuft of siphon trifid ; middle tooth of pecten with only a single secondary denticle ; saddle hair and anal papillae missing.

It is clear that this material has been wrongly assigned to *apicalis*. In my opinion the differences noted above are sufficiently slight for it to be identified with *territans*, and the name *territans* Walker should be substituted for *apicalis* Adams in the British list. The only other *Neoculex* which seems likely to be encountered in the British Isles is *C.* (*N.*) *hortensis* Ficalbi, which is normally regarded as a Mediterranean and Central European species but which has on occasion been recorded from as far North as Berlin. Females of this species might occasionally be confused with those of *territans* since dark specimens of the latter, such as those from the Lake District, may show a very distinct pale spot at the tip of the hind tibia.

The type series of *Culex apicalis* var. *judaicus* Edwards shows certain resemblance to *apicalis*. Some of these may be due to convergence. Thus desert and semi-desert species of *Culex* very generally show reduction of the long hairs on the male palp. In my opinion this form should be treated as a distinct species. Differences from the description of *territans* given above are as follows. Early stages are not available :

Adult ♂.—Long hairs on palps much reduced, the long joint with only one or two at the extreme apex. Combined length of the two terminal segments slightly less than half that of the proboscis. Dististyle devoid of membranous lobes and microsetae. Subapical lobe of basistyle with five smaller setae in addition to the two larger ones with hooked apices. Four of these setae provided with backwardly directed teeth and longer than the fifth. Lateral lobes of phallosome rather less rugose, the papillae confined to the extreme tip.

Adult ♀.—Upright forked scales of vertex very pale, almost white. Mesonotal scales very pale brown or whitish.

Specimens from Macedonia (Janes, Gorgop) agree closely with the British form of *territans* but have the siphon longer (index about 8 as compared to about 6) and the basal subventral tufts relatively shorter (about $\frac{1}{5}$ the length of the siphon). The pupa resembles that of *territans*, and I think it is clear that they should be assigned to this species.

A unique female adult from Southern Spain and the holotype female of *Culex sergenti* Theobald from Algeria agree with *territans* in the characters noted above except that the former has the pale ventral stripe on the hind femur interrupted near the apex.

A series of adults of both sexes from France (Soucy, Rambouillet) show no significant differences from the British *territans*.

Specimens from Teneriffe described by Christophers (1929) as *apicalis* Adams clearly belong to a distinct new species. They will be discussed elsewhere.

References.

Bohart, R. M., 1948, The subgenus *Neoculex* in America north of Mexico (Diptera, Culicidae). *Ann. ent. Soc. Amer.* **41** : 330–345.

Christophers, S. R., 1929, Note on a collection of Anopheline and Culicine mosquitoes from Madeira and the Canary Islands. *Indian J. med. Res.* **17** : 518–530.

A NEW ACCOUNT OF *APHIS COMPOSITELLAE* THEOBALD (HEM., APHIDIDAE).

By H. L. G. Stroyan, M.A., F.R.E.S.

Aphis compositellae was described by Theobald (1924) from type material collected at Newborough, Anglesey, and at Bangor, Caerns., in 1923 by Mr. C. L. Walton. The description was later repeated (1927) in Vol. II of *The Plantlice of Great Britain*. The host plants quoted were "*Sonchus* sp. and another Composite," and Prof. Theobald added the note, "I could not identify the species of *Sonchus*, nor the other Composite it was found upon by Mr. Walton."

No subsequent records of this aphid have been found by the present author up to the time of writing; and no mention of the species was made by Hille Ris Lambers (1933–34) in his account of his examination of the Theobald collection in the British Museum (Natural History). In 1949 the writer had several opportunities of examining the type material of *compositellae* through the courtesy of Mr. F. Laing, and found that the Theobald material in fact contained two species: one apparently a *Nasonovia* and the other (which was not present in the actual type slides) a *Brachycaudus*. Mr. Hille Ris Lambers was informed of this discovery, since at the time it seemed likely that the species would prove identical with his *Submacrosiphon hieracii* (Kalt.) ssp. *nigrum* H. R. L. (later known as *Nasonovia nigra* (H. R. L.)). However, a careful comparison of *compositellae* with cotypes of *nigra* and further slides of the latter from southern Holland showed that there were good differences between the two forms. The result of this investigation was summarised by Hille Ris Lambers (1949) in a footnote to his treatment of *Nasonovia* Mordvilko, and also referred to very briefly by Börner (1952) in his *Europae Centralis Aphides*. There remained an uncertainty about the original host plant of *compositellae*. The mono-holocyclic species of *Nasonovia* are so far only known from species of *Hieracium*, and no species has been recorded from any *Sonchus*. Mr. Laing, who had collected frequently in North Wales, wrote in a letter that he had never met with *nigra* there (this was while it still appeared that *nigra* and *compositellae* were synonymous); and no species of *Nasonovia* other than *ribicola* (Kalt.) (=*ribis-nigri* (Mosley)) occurs in the list published by Thomas and Jacob (1940) of aphids collected by them in North Wales in 1938–39.

On 2nd June, 1951, while collecting in the vicinity of Bassenthwaite Lake, Cumberland, the writer found a species of *Nasonovia* extremely abundant on the heads and up the stems of *Hieracium exotericum* Jordan ap. Boreau (agg.), ± f. (? sp.) *grandidens* Dahlstedt, growing on a stone wall bounding the grounds of the Armathwaite Hall Hotel. A large sample was taken, and noted in the notebook as *N. nigra* (H. R. L.), whose host plant is given as *H. murorum* (=*H. exotericum* pro maj. parte). It was therefore extremely surprising to find later on examining this material that it was quite distinct from Dutch material of *nigra*, and agreed in detail with the type material of *compositellae* Theobald.

This occurrence suggested the desirability of a further inquiry into the status of *N. nigra* and *N. compositellae* in Britain. Previously the only authority for regarding *nigra* as a British aphid (though it was highly probable that it was so) was Hille Ris Lambers's (1949) suggestion that a part of Theobald's (1926) *Myzus hieracii* (Kalt.) was, in fact, truly identified. Earlier the same author (1933) had stated that *M. hieracii* of Theobald is the summer form of *ribicola* (Kalt.). To clear up this point an examination was made by the present writer of all the material of "*hieracii*" in the Theobald collection. Twenty samples in all were found to be represented, and none of these contained any specimens of *N. nigra*, though one or two specimens from *Hieracium pilosella* were possibly *N. pilosellae* (Börner). The remainder were all *N. ribis-nigri* (Mosley) (*ribicola* Kalt.).

However, on 25th May, 1952, a large sample of a *Nasonovia* was collected from *Hieracium exotericum* growing on the sides of a chalk cutting at Royston, Herts., the basal leaves of which were rolled in typical fashion ; and on examination these proved to be almost certainly identical with *N. nigra* (H. R. L.). This population persisted all through the summer, and a further sample of apterae only was taken on 26th August.

In late June, 1952, Mr. P. D. Sell, of the Department of Botany, Cambridge University, while collecting endemic species of *Hieracium* in North Wales, took a very small sample (5 apterae and 1 alata) of a black *Nasonovia* on the very restricted endemic *H. deganwyense* Pugsl. at Deganwy, Caerns. This appears to be a small form, or perhaps a biosubspecies, of *N. compositellae* (Theobald). To complete the list of material collected during 1952 a second sample was collected at Armathwaite on 24th July, consisting of apterae only of *N. compositellae.*

Other species of *Hieracium* examined (*H. anglorum* (Ley) Pugsley, *bladonii* Pugsl., *brunneocroceum* Pugsl., *lachenalii* Gmelin, *maculatum* Sm., *tridentatum* Fr., *umbellatum* L. and ? *lepidulum* Stenst.) yielded no material of either species of aphid. *H. lachenalii* was ignored at Royston even when growing intermingled with *H. exotericum* in dense stands, although a few weeks later the same species was found in Norfolk acting as host to apparently typical *N. pilosellae* (Börner), the leaves of the rosette and lower stem leaves being rolled in the typical manner. It would thus appear that *H. exotericum* in its various forms is the most favoured host of both species of aphid. This may be at least partly due to the ecological preferences of the hawkweed, and to the density of the stands formed by *exotericum* where its requirements are met by the environment. However, no aphids were found on very dense *H. exotericum* f. *sublepistoides* (Zahn) Pugsley growing on the Gogmagog Hills, Cambs. Here the ecological factors of the habitat were probably adverse ; in the writer's experience both species of *Nasonovia* require at least moderately shaded habitats, and the *Hieracium* in this locality was exposed to full sun for most of the day.

The following notes on *Nasonovia nigra* and *N. compositellae* are based on examination of all the various samples of material referred to in the foregoing paragraphs :

Colour Notes.

Theobald describes the types of *compositellae* as green to yellowish-green (alatae) and green to yellow (apterae). It must be remembered that the

material was a mixture of two species, one apparently *Brachycaudus helichrysi* (Kalt.), which is commonly yellowish-green in colour. Hille Ris Lambers describes *nigra* as dark green (apterae) or shiny green (alatae) with the sclerotic parts black. According to the material collected by the writer in Hertfordshire and Cumberland both species are frequently strongly tinged with orange-red in the apterae, and quite indistinguishable from each other by colour when alive.

Sclerotisation.

Comparison of the Cumbrian material of *compositellae* with Dutch *nigra* at first suggested that there was a distinct if somewhat ill-defined difference both in the antennal pigmentation of the apterae and the abdominal sclerotic pattern of the alatae. *N. nigra* apterae from Limburg have the antennae mainly pale, with only joint VI, part of V and the apices of IV and III darker ; while alatae have the pleural sclerites of the abdominal intersegments in well-separated pairs which hardly ever fuse across the mid-dorsal line. This latter character is confirmed by Hille Ris Lambers's description of the alatae. *N. compositellae* apterae have on the average much more heavily pigmented antennae—as a rule all V and most of IV are darkened, and sometimes the antenna is almost uniformly dark sclerotic—and the alatae have a more heavily marked dorsal pattern in which the paired pleural sclerites frequently fuse medially, and may even begin to fuse with segmental sclerites to form an irregular and much broken patch.

The distinctness of this picture was however rendered illusory by the material of *nigra* from Royston, which shows a gradation from rather lightly pigmented aphids to specimens equalling the Cumbrian *compositellae* in intensity of pigmentation.

The scanty material of the small form from *Hieracium deganwyense* shows the dark facies of the *compositellae* type in a rather extreme degree.

Morphology.

Hille Ris Lambers (1949) has given an excellent description of the morphology of *N. nigra*, nearly every detail of which applies equally to material of *N. compositellae*. No description in detail will therefore be given here, except for such characters as differ between the two forms. It has proved impossible to obtain reliable characters for separation from the chaetotaxy, structure of the frons, rostrum, siphunculi or cauda, or from the presence and distribution of marginal tubercles.

N. nigra and *compositellae* are thus so similar that it is tempting to view them as forms of a single species, particularly in view of their ecological similarity. However, it was noticed at the outset when types of *compositellae* were compared with Dutch, Italian and Swedish material of *nigra* that there were apparently valid characters for separation in the relative and absolute length of the processus terminalis and in the presence or absence of secondary rhinaria on antennal joint IV in apterae or V in alatae. These differences are confirmed by reference to the Cumbrian material of *compositellae* and the Hertfordshire *nigra*.

Tables I to III express the first of these differences in terms of the range of variation for three different ratios : the body length to antennal flagellum

length, the commonly used processus terminalis/ant. VI (base) ratio and the less common ratio of processus/ant. III.

The presence or absence of secondary rhinaria on joints IV and V in apterae and alatae respectively will be seen by reference to the appended tables of biometric data to be a rather constant and valuable character. However, occasional specimens of *nigra* bear one or two rhinaria on these joints, while such rhinaria may be quite absent from one or both antennae in *compositellae*.

A further character giving a slight degree of separation, though valid only statistically, is the ratio of siphuncular to caudal length in apterae (Table IV). Mean values for this ratio are higher in *nigra* than in *compositellae*, but the overlap is such as to obscure the distinction when considering individual specimens.

Systematic Discussion.

The question of the taxonomic status to be assigned to *Nasonovia compositellae* (Theobald) is an interesting and a rather difficult one. The picture presented by distributional and variational data for aphids as a whole suggests that, owing largely to their high dispersibility and their independence for considerable periods (and sometimes altogether) of conjugative reproduction, speciation in the group is predominantly ecological, and that geographical isolation in the accepted sense plays a rather unimportant or even negligible part in aphid evolution at species level.

The rediscovery of *compositellae* in a habitat almost exactly similar to that of *nigra*, and on a host plant considered by botanical specialists to be at most a subspecies of that of *nigra*, made it appear that this was probably one instance where geographical rather than ecological replacement must be invoked. *N. compositellae* has now been found only in North Wales and Cumberland, i.e., in the extreme west of Great Britain ; while *N. nigra* has a wide distribution in Europe as a whole, from Italy to Sweden, Germany, Holland and England. In England, however, it has not yet been found in the west and north-west.

The characters of the sample taken at Royston in 1952 tend on first inspection to blur the outlines of this rather attractive conception. The intermediate pigmentation facies and the similarly intermediate range for the p.t./VIb ratio (Table II) both suggest the possibility of an intraspecific east-west or S.E.–N.W. cline in these characters, which argues the reduction of *compositellae* to the status of a rather sharply characterised subspecies at the end of the cline. This may still be the ultimate verdict when further evidence becomes available, in which case the rather unfortunate circumstance will arise that *compositellae* will become nominally the main species, and *nigra* a subspecific grouping.

However, a more careful examination of the biometric data shows that this apparent clinal gradation consists in only two characters (mentioned above), one of which is of a physiological nature and probably liable to climatic influence,

---

PLATE 1.

Fig. 1.—Alate viviparous female *Nasonovia nigra* (H. R. L.).
Fig. 2.—Apterous viviparous female *N. nigra* (H. R. L.).
Fig. 3.—Apterous viviparous female *N. compositellae* (Theob.).
Fig. 4.—Alate viviparous female *N. compositellae* (Theob.).

Nasonovia nigra and *N. compositellae*.

H. L. G. Stroyan.

Adlard & Son, Ltd., Dorking.

and the other highly sensitive to very small random variations which are in themselves probably quite insignificant.

To take these points in order: first, the pigmentation facies. Among butterflies there are a number of well known and documented instances of pigmentation clines for melanic markings, particularly among the Nymphalidae. In at least one of these, the Small Tortoiseshell Butterfly, *Aglais urticae* (L.), it has been found possible to simulate the clinal extremes, *ichnusa* Bon. (Corsica) and *polaris* Staud. (boreal), by subjecting the pupae to continued high and low temperatures respectively; although the high-temperature forms do not agree completely in wing shape with the naturally occurring *ichnusa*, where geographical isolation has also contributed to the formation of a rather distinct race. Standfuss (1896) has pointed out that in the majority of cases in the European fauna widely distributed species are more heavily marked with black over the northern parts of their range than in the south. This is due to the fact that melanin deposition in the pupal wing apparently continues up to a very late stage in development, and a shortening of the pupal stadium due to climatic influences reduces the amount of melanin which can be laid down.[1] In *Nasonovia nigra* material from South Limburg is appreciably less heavily pigmented than material of *nigra* and *compositellae* from England and Wales. It should be noted here that the determining factor in melanin pigmentation in *Nasonovia* and other genera of aphids will be the mean summer temperature, since it is the life-cycle of the individual rather than the annual cycle of the species which is affected. Thus it is in accordance with expectation that British material should be on an average more darkly pigmented than aphids from the continent of Europe.

The evidence quoted supports the view that melanin pigmentation is subject to climatic influences, and obeys as a general rule physiological principles of a non-specific nature. This does not mean of course that clinal gradations in pigmentation should not be recognised taxonomically for practical purposes; but it does mean that the gradation may be independent of and continued across specific boundaries, and that care must be exercised in using it as a taxonomic criterion.

Secondly, the processus terminalis/ant. VIb ratio. This is in very general use among aphidologists as a specific diagnostic. However, in groups where the processus is very much longer than the basal part of VI, as in *Nasonovia* Mordv., there is an inherent danger in the use of this ratio. There is some reason to suppose that the differences in the relative lengths of these two parts of the joint between different individuals are due at least in part, not so much to an increase or decrease in the length of one part relative to the other as to a slight shift in the position of the primary rhinarium which lies at the demarcation of the processus from the base. Now in the case of a long sixth joint whose processus is from three to eight times as long as the base a shift in the position of the primary rhinarium, which may amount to only about 2 per cent. of the length of the processus, will represent an increase or decrease of anything from 6 to 16 per cent. in the length of the basal part of the joint. Further, it is this disproportionate percentage increase or decrease in the basal part of the joint which determines the size of the fluctuation in the p.t./VIb

[1] Increased temperature in fact depresses the formation of melanin as well as accelerating development.

ratio brought about by the shift of the primary rhinarium. The fluctuation of the ratio is also further increased by the fact that any shift in the position of the rhinarium produces changes of opposite sign in the lengths of the two portions of the joint.

The results of this sensitivity of the p.t./VIb ratio in the present case can be seen in Table II. The material of *nigra* from Holland and England shows two rather different though overlapping ranges for this ratio, the English aphids having a lower range than the Dutch, and thus appearing to represent a stage of transition from the high values of *nigra* to the low values of *compositellae*. Apart from this, one sample of *compositellae* (that from Armathwaite, 24.vii.52) shows such a wide range of variation for this character that it actually embraces the total ranges of all the other samples of both *nigra* and *compositellae*!

But when the length of the processus terminalis is embodied in ratios involving other measurements more nearly equal in magnitude, and independent of it in the sense that variation in processus length is not inevitably accompanied by a variation of opposite sign in the other variable, a very different and much more consistent picture is presented (Tables I, III). The material now falls clearly into two well-marked and compact groups with characteristic ranges of variation, overlapping much more slightly than the p.t./VIb ratio, and entirely failing to support the clinal conception for the two forms. The two ratios (body/antennal flagellum) and (processus terminalis/ant. III), together with the constant rhinarial differences between the forms, appear to be characters on which a good degree of reliance may be placed, since (*a*) there is at present no evidence to link any of them with climatic or ecological factors, and (*b*) their constancy over both geographical and seasonal ranges is of a high order for the admittedly exiguous available material.

The small sample from *Hieracium deganwyense* has not been included in the above discussion, since it is really too small a population on which to base conclusions. Its provenance and the values of the length ratios given by the only three specimens with a complete processus terminalis agree closely with *compositellae*. The absence of secondary rhinaria from IV in the apterae (apart from a single one in one specimen), and from V in the sole alata, suggests that this form may be an ecologically distinct subspecies from the aphids on *H. exotericum*; but as it is by no means certain that the types of *compositellae* were found on *H. exotericum*, it is safer not to speculate on the ecological aspect of this question. The sample from *H. deganwyense* is therefore referred tentatively to *compositellae*.

Summary.

An account has been given of the re-finding after an interval of 28 years of *Nasonovia compositellae* (Theobald), living mono-holocyclically on *Hieracium exotericum* Jordan ap. Boreau (agg.) in Cumberland. Records have been given of further material of this species and of *N. nigra* (H. R. L.) collected subsequently, and a discussion has been added of the morphological and other differences observable between the two forms, with their probable implications for the taxonomy of the group. Reasons are given for believing that *N. nigra* and *N. compositellae* are good species rather than stages of an intraspecific cline. The biometric data supporting the argument are given in Tables I–V.

TABLE I.—*Body : Antennal Flagellum Ratio.*

	Apt.	Al.
N. nigra (H. R. L.)		
Limburg, 28.vi.49 . . .	0·99–1·15	0·89–1·09
Royston, 25.v.52 . . .	0·97–1·17	1·03–1·10
,, 26.viii.52 . . .	0·98–1·18	None
N. compositellae (Theob.)		
Armathwaite, 2.vi.51 . .	1·18–1·37	1·10–1·25
Deganwy, –.vi.52 . . .	1·17–1·34	1·07
N. Wales, –.vii.23 (types) . .	1·24–1·41	1·18
Armathwaite, 24.vii.52 . .	1·09–1·56	None

TABLE II.—*Processus terminalis : Base of VI Ratio.*

	Apt.	Al.
N. nigra (H. R. L.)		
Limburg, 28.vi.49 . . .	6·2–7·8	7·3–8·8
Royston, 25.v.52 . . .	5·75–6·64	6·24–7·13
,, 26.viii.52 . . .	5·29–6·50	None
N. compositellae (Theob.)		
Armathwaite, 2.vi.51 . .	3·3–4·7	4·2–5·4
Deganwy, –.vi.52 . . .	3·61–4·50	5·00 ?
N. Wales, –.vii.23 (types) . .	4·5–5·0	4·9
Armathwaite, 24.vii.52 . .	3·29–6·67	None

TABLE III.—*Processus terminalis : Ant. III ratio.*

	Apt.	Al.
N. nigra (H. R. L.)		
Limburg, 28.vi.49 . . .	1·29–1·56	1·38–1·58
Royston, 25.v.52 . . .	1·21–1·50	1·34–1·51
,, 26.viii.52 . . .	1·28–1·60	None
N. compositellae (Theob.)		
Armathwaite, 2.vi.51 . .	0·85–1·11	0·87–1·05
Deganwy, –.vi.52 . . .	0·79–0·98	0·83 ?
N. Wales, –.vii.23 (types) . .	0·87–1·11	0·92
Armathwaite, 24.vii.52 . .	0·77–1·23	None

TABLE IV.—*Siphunculus : cauda ratio (apterae).*

	Range.	Mean value.
N. nigra (H. R. L.)		
Limburg, 28.vi.49 . . .	1·46–1·82	1·56
Royston, 25.v.52 . . .	1·58–1·85	1·69
,, 26.viii.52 . . .	1·55–1·80	1·66
N. compositellae (Theob.)		
Armathwaite, 2.vi.51 . .	1·35–1·67	1·51
Deganwy, –.vi.52 . . .	1·29–1·62	1·48
N. Wales, –.vii.23 (types) . .	1·29–1·57	1·43
Armathwaite, 24.vii.52 . .	1·18–1·64	1·47

TABLE V.—*Biometric data for measured specimens.*

Sample.	Body.	Ant.	Joint ratios (III–VI).	Siph.	Cauda.	Rhinarial numbers. Left.	Right.	Form.
nigra	2·58	2·25	35 : 27 : 21½ : 7 + 50	0·40	0·22	13/0/0	16/0/0	Apt.
(1)	2·24	2·06	33½ : 21½ : 20 : 7 + 47	0·37	0·25	19/0/0	16/0/0	,,
	2·10	2·01	32 : 21½ : 19 : 6 + 47	0·33	0·22	8/0/0	11/0/0	,,
	2·22	2·19	35½ : 24½ : 21 : 7 + 49	0·38	0·26	24/1/0	23/1/0	,,
	2·27	1·98	34 : 21 : 19 : 6 + 44	0·36	0·24	13/0/0	12/0/0	,,
	2·15	1·93	30½ : 20 : 18½ : 6½ + 45	0·38	0·24	7/0/0	6/0/0	,,
	2·00	2·01	30½ : 21½ : 20 : 6 + 47½	0·35	0·22	6/0/0	5/0/0	,,
	1·87	1·76	30 : 17 : 16½ : 6½ + 40	0·34	0·22	13/0/0	12/0/0	,,
	2·69	2·46	39 : 27 : 23 : 7 + 58	0·36	0·25	35/4/0	31/6/0	Al.
	2·30	2·40	37 : 27 : 23 : 7 + 56	0·33	0·22	42/10/0	41/9/0	,,
	2·29	2·38	36 : 27 : 22 : 6½ + 57	0·34	0·20	32/6/0	33/4/0	,,
	2·00	2·01	32 : 23½ : 19 : 6 + 45	0·30	0·18	29/10/0	32/8/0	,,
	2·48	2·50	39 : 29 : 25 : 7 + 56½	0·39	0·22	31/10/0	28/12/0	,,
	2·27	2·55	40 : 30½ : 24 : 7 + 58	0·38	0·22	38/9/0	38/8/0	,,
	2·34	2·47	38 : 30 : 25 : 6½ + 55	0·34	0·21	37/11/0	38/13/0	,,
	2·10	2·28	38 : 24 : 21½ : 6½ + 52½	0·35	0·21	27/5/0	31/4/0	,,
nigra	2·64	2·37 ?	38½ : 28 : 23 : 8½ + 50 ?	0·46	0·28	26/3/0	24/4/0	Apt.
(2)	2·40	2·26	35½ : 25 : 23 : 8 + 49½	0·43	0·26	20/0/0	18/0/0	,,
	1·86	1·92	30 : 22 : 19 : 7 + 42	0·40	0·22	11/0/0	13/0/0	,,
	2·50	2·26	38 : 27½ : 22 : 8 + 46	0·46	0·28	22/0/0	17/2/0	,,
	2·35	2·18	37 : 25 : 21 : 7 + 46½	0·43	0·26	22/0/0	21/0/0	,,
	2·51	2·39 ?	39½ : 28½ : 23 : 8½ + 50	0·50	0·27	22/0/0	23/0/0	,,
	2·52	2·32	38 : 27 : 23 : 8 + 49	0·48	0·28	20/0/0	17/0/0	,,
	2·51	2·47	37½ : 31 : 25 : 8 + 53	0·46	0·28	15/0/0	18/0/0	,,
	2·30	2·01	31 : 22½ : 18½ : 7½ + 46½	0·40	0·23	13/0/0	—	,,
	2·22	1·90	32 : 20½ : 17 : 7 + 42	0·38	0·24	10/0/0	12/0/0	,,
	2·40	2·30	35 : 27 : 21 : 8 + 53	0·38	0·22	25/12/0	35/13/1	Al.
	2·59	2·51	39 : 29 : 24 : 8 + 57	0·42	0·24	34/12/0	37/13/0	,,
	2·51	2·28	38 : 24 : 22 : 7½ + 51	0·40	0·22	36/9/0	32/7/0	,,
	2·67	2·45	39 : 29½ : 23 : 8½ + 53	0·44	0·25	38/13/0	36/13/0	,,
	2·57	2·49	39 : 27½ : 24 : 8 + 57	0·43	0·24	35/9/0	35/12/0	,,
nigra	2·11	1·92	32½ : 18½ : 20 : 7½ + 41½	0·39	0·22	11/0/0	12/0/0	Apt.
(3)	2·42	2·13	34 : 23 : 20½ : 7½ + 48	0·41	0·26	20/0/0	16/0/0	,,
	2·13	1·98	31 : 22 : 18½ : 7½ + 45	0·40	0·25	14/0/0	15/0/0	,,
	1·95	1·65	27½ : 16 : 15½ : 7 + 37	0·36	0·20	7/0/0	7/0/0	,,
	1·90	1·94	30 : 20½ : 18 : 7 + 45½	0·38	0·23	14/0/0	15/0/0	,,
	1·97	1·84	31 : 21 : 15 : 7 + 41	0·34	0·22	9/0/0	9/0/0	,,
	2·05	1·88	31 : 21 : 17 : 6½ + 42	0·42	0·24	14/0/0	12/0/0	,,
	1·96	2·00	30 : 21 : 18½ : 7½ + 48	0·38	0·23	14/0/0	16/0/0	,,
	2·18	2·01	34 : 21½ : 17½ : 7 + 45½	0·40	0·25	14/0/0	15/0/0	,,
	2·20	2·03	33 : 22 : 19½ : 7½ + 45	0·42	0·25	24/0/0	18/0/0	,,
comp.	2·08	1·64	32 : 18 : 17 : 6½ + 29	0·31	0·22	18/3/0	15/1/0	Apt.
(1)	2·32	1·96	34 : 23 : 21 : 9½ + 35	0·40	0·26	22/6/0	27/5/0	,,
	2·22	1·62	29 : 17½ : 18 : 8 + 29	0·35	0·21	14/3/0	13/0/0	,,
	2·14	1·63	28½ : 18 : 16½ : 8 + 31	0·34	0·22	16/2/0	16/0/0	,,
	2·05	1·58	27 : 18 : 16 : 8 + 30	0·32	0·21	15/0/0	16/0/0	,,
	2·42	2·02	41 : 22½ : 20 : 7½ + 35	0·38	0·26	36/8/0	32/7/0	,,
	2·21	1·74	33 : 20 : 16½ : 7 + 32½	0·34	0·22	19/4/0	18/6/0	,,
	2·26	1·86	34½ : 21½ : 19 : 7½ + 34	0·35	0·26	21/5/0	26/5/0	,,
	2·53	?	41 : 23 : 21 : 8 + ?	0·35	0·21	41/11/4	35/10/7	Al.

TABLE V.—*continued.*

Sample.	Body.	Ant.	Joint ratios (III–VI).	Siph.	Cauda.	Rhinarial numbers. Left.	Right.	Form.
	2·27	?	40 : 23 : 20 : ?	0·32	0·20	38/11/3	43/12/3	,,
	2·50	2·01	39 : 23 : 22 : $7\frac{1}{2}$ + 34	0·37	0·23	38/12/3	43/11/3	,,
	2·29	1·98	39 : 21 : 21 : 8 + 35	0·33	0·23	31/13/4	34/11/4	,,
	2·59	?	47 : 25 : 23 : 8 + ?	0·38	0·23	45/15/4	42/15/7	,,
	2·74	2·31	44 : 27 : $22\frac{1}{2}$: 8 + 43	0·35	0·22	41/12/4	45/10/3	,,
	2·42	2·10	38 : 25 : $20\frac{1}{2}$: $7\frac{1}{2}$ + 40	0·34	0·21	33/9/2	33/12/3	,,
	2·27	2·06	37 : $23\frac{1}{2}$: 21 : 8 + 39	0·33	0·21	42/11/4	41/11/5	,,
comp.	1·74	1·30	24 : 14 : 13 : $6\frac{1}{2}$ + $23\frac{1}{2}$	0·27	0·21	16/1/0	18/0/0	Apt.
(2)	1·97	1·68	34 : 22 : 16 : 6 + 27	0·34	0·21	27/0/0	23/0/0	,,
	1·60	?	29 : $16\frac{1}{2}$: $13\frac{1}{2}$: $5\frac{1}{2}$ + ?	0·29	0·19	23/0/0	25/0/0	,,
	1·46	?	26 : 13 : 11 : ?	0·24	0·17	18/0/0	17/0/0	,,
	1·35 ?	?	24 : 11 : 10 : 5 + ?	0·25	0·16	16/0/0	13/0/0	,,
	1·95	1·82	36 : 24 : 18 : 6 + 30	0·30	0·19	43/13/0	42/9/0	Al.
comp.	1·79	1·39	32 : 20 : 16 : 7 + 32	0·26	0·19	15/0/0	16/1/0	Apt.
(3).	1·81	1·46	33 : 21 : 17 : $7\frac{1}{2}$ + 34	0·27	0·21	17/1/0	..	,,
Types*	1·68	1·19	27 : 15 : $13\frac{1}{2}$: 6 + 30	0·26	0·18	12/0/0	13/0/0	,,
	1·64	1·24	27 : 16 : 16 : $6\frac{1}{2}$ + 30	0·23	0·17	14/0/0	..	,,
	2·01	?	38 : $23\frac{1}{2}$: 20 : 7 + ?	0·33	0·21	..	22/5/0	,,
	1·81	1·38	31 : 19 : $17\frac{1}{2}$: 7 + 32	0·26	0·18	12/1/0	..	,,
	2·01	1·54	38 : 21 : 20 : 7 + 33	0·30	0·21	24/6/0	26/4/0	,,
	1·79	1·52	37 : 21 : 18 : 7 + 34	0·23	0·20	24/11/3	27/9/3	Al.
comp.	2·10	1·78	30 : $18\frac{1}{2}$: $18\frac{1}{2}$: 7 + 37	0·34	0·22	19/0/0	17/2/0	Apt.
(4)	2·40	1·99	$36\frac{1}{2}$: 21 : 21 : 8 + 38	0·38	0·26	29/4/0	27/4/0	,,
	2·26	2·03	36 : $23\frac{1}{2}$: $21\frac{1}{2}$: 8 + 38	0·36	0·22	25/6/0	26/7/0	,,
	2·17	1·82	32 : 20 : 19 : $7\frac{1}{2}$ + 35	0·35	0·24	19/2/0	21/3/0	,,
	2·11	1·75	30 : 20 : 18 : 8 + $33\frac{1}{2}$	0·32	0·22	19/2/0	19/3/0	,,
	2·08	1·90	$33\frac{1}{2}$: $21\frac{1}{2}$: $17\frac{1}{2}$: 6 + 40	0·34	0·23	22/2/0	25/2/0	,,
	2·24	1·44	30 : 16 : 14 : 7 + 23	0·32	0·22	20/4/0	18/2/0	,,
	2·06	1·69	$29\frac{1}{2}$: $19\frac{1}{2}$: 16 : 6 + $34\frac{1}{2}$	0·33	0·22	20/4/0	19/4/0	,,
	2·00	1·58	$29\frac{1}{2}$: $16\frac{1}{2}$: $16\frac{1}{2}$: 7 + 29	0·34	0·22	23/2/0	21/4/0	,,
	1·81	1·25	22 : 13 : 13 : 6 + 24	0·26	0·22	8/1/0	11/1/0	,,

* The antennal joint ratios of the type material are given in different arbitrary units from those of the other samples.

Order of samples is the same as in Tables I to IV inclusive. All length measurements in mm.; antennal length for flagellum (joints III to VI) only.

It must be emphasized that this paper is intended as a contribution to the final elucidation of the complex of *Nasonovia* species living on *Hieracium*, and not as a definitive account of the taxonomy of the two species discussed. A comparison of the data with similar data for material of *nigra* from other parts of Europe, and from intervening (e.g., West Midland) districts of England, is essential to a satisfactory understanding of the problem, and it is hoped that subsequent research may provide the necessary material for such comparisons.

ACKNOWLEDGMENTS.

The writer has incurred a debt of gratitude at various times during the course of this investigation to the following persons, whose help is here gratefully

acknowledged: Messrs. F. Laing and J. P. Doncaster, for the provision of facilities for the examination of material from the Theobald collection of British Aphididae in the British Museum (Nat. Hist.); Mr. D. Hille Ris Lambers for the loan of Swedish and Italian material of *Nasonovia nigra* (H. R. L.), and for much helpful discussion; and Mr. P. D. Sell of the Department of Botany, Downing St., Cambridge, for kindly identifying many species of *Hieracium* and for collecting aphid material while visiting North Wales. The writer is indebted to the Ministry of Agriculture and Fisheries for permission to publish the results of this work.

References.

Börner, C., 1952, Europae Centralis Aphides. *Mitt. Thüring. botan. Ges.* Beiheft **3**, 137.

Hille Ris Lambers, D., 1933–34, Notes on Theobald's "The Plant-lice or Aphididae of Great Britain." *Stylops* **2**: 169–176; **3**: 25–33.

——, 1949, Contributions to a monograph of the Aphididae of Europe: Part IV. *Temminckia* **8**: 182–323.

Pugsley, H. W., 1948, A prodromus of the British Hieracia. *J. Linn. Soc. Lond.* **54**: 1–356.

Standfuss, M., 1896, *Handbuch der paläarktischen Gross-Schmetterlinge für Forscher und Sammler.* Jena.

Theobald, F. V., 1924, New and little known British Aphides. *Ent. mon. Mag.* (3) **60**: 124–130.

——, 1926–27, *The Plantlice or Aphididae of Great Britain* **1** and **2**.

Thomas, I., and Jacob, F. H., 1940, A list of Aphididae collected mainly in North Wales during 1938 and 1939. *Northw. Nat.* **15**: 139–153.

Postscript.

On page 461 of *Europae centralis Aphides* by Dr. Carl Börner (1952, *Mitt. thüring. botan. Ges.*, Beiheft **3**, 2. Lieferung) the statement (*in litteris*) is ascribed to me that the name *compositellae* Theob. falls as a synonym of *ribis-nigri* Mosley. I am not responsible for such a statement, and can find nothing in any letter written by me to Dr. Börner which could be so interpreted. I am therefore unable to suggest how this misunderstanding has arisen, and wish to take this opportunity of correcting it.

FURTHER NOTES ON SAMOAN ODONATA BELONGING TO THE ISCHNURINE COMPLEX OF SPECIES, WITH DESCRIPTIONS OF TWO NEW SPECIES AND SOME UNKNOWN FEMALES.

By Lt.-Col. F. C. Fraser, I.M.S. (Retd.), F.R.E.S.

During the past year I have received from Dr. John S. Armstrong of the Government Hospital, Apia, W. Samoa, two collections of Odonata which not only include all the species originally reported by myself, but also two new species belonging to the Ischnurine complex, one of which is a new *Pacificagrion*, a remarkable genus hitherto represented only by a single species, *lachrymosa* Fraser. This new species possesses a pterostigma in the fore wings as remarkable in its way as that of *lachrymosa*.

In order to facilitate the recognition of the females of the various species, Dr. Armstrong has sent me a large number of specimens of that sex, so that I have at last been able to describe all the females of the ten species known from the Samoan islands. He has also succeeded in finding the female of *Agriocnemis interrupta* Fraser, which is described below.

Pacificagrion dolorosa sp. n. (figs. 2,3, 8, 9, 12, 14, 16 and 17).

Male.—Abdomen 29 mm. Hind wing 16·5 mm.; fore wing 17 mm. Head: Labium creamy white, labrum, genae, anteclypeus and a narrow transverse stripe across the lower frons, which is interrupted in the middle, greenish blue: a narrow stripe at base of labrum and the postclypeus glossy black with a steely greenish reflex. The whole of the occiput and vertex matt black, a narrow isthmus of black joining the anteclypeus and vertex medially so as to interrupt the pale colour of frons; lastly large triangular blue postocular spots. Beneath head pale yellow bordered above and in the occipital cavity with black. Prothorax black on dorsum, the sides and an anterior collar broadly pale greenish yellow; lobe of prothorax depressed, broadly and flatly rounded. Thorax steely blue-black on dorsum to a level posterior to humeral suture, marked with complete antehumeral stripes which are broadened below and of a bluish-green colour (but most certainly azure blue during life), the sides pale blue with a narrow line of black on the upper half of the antero-lateral suture and a broad complete black stripe on the second which is constricted in its lower half. Beneath pale yellow. Legs pale creamy yellow with black spines, the extensor surfaces of tibiae and femora black, but this colour, on the latter, changing to castaneous on the proximal two-thirds. Wings hyaline; pterostigma of fore wing invading the wing, eye-shaped, this latter being enhanced by a large blackish-brown pupil covering the proximal two-thirds, the proximal border straight and narrow, the distal convex and joining the posterior side by a rounded angle, framed in black, the outer third peach-blossom pink. That of hind wing normal in shape, narrow and elongate; distal side short and oblique, proximal slightly longer and more oblique, the distal angle acute, framed in black, the central portion pale brown, covering about one and a half cells. 13 postnodals in fore wings, 11 in the hind; Rii very obliquely angulated at the level of the pterostigmal brace so that it appears to be continued as the brace; Ri appearing to end in the pterostigma, its distal end resembling cross-veins running from the pterostigma to the wing border and Rii. Abdomen with dorsum castaneous to as far as segment 6, the sides of these segments and the whole of the ventral surface of abdomen chrome yellow; segment 1 steely blue black, as well as the basal portion of segment 2; broad black apical rings on segments 3 to 6, dorsum of segment 7 coppery metallic, whilst segments 8 to 10 are azure blue, the former

segment with a narrow black basal line and a second black line on the lower part of its side which is continued on to 9. The blue on segment 10 limited to a transverse oval spot on dorsum which is framed in black. Anal appendages black, subequal, the superiors slightly the longer, both forcipate and longer than segment 10, which latter, however, is considerably lengthened dorsally by a narrow projecting truncated lobe, a little emarginate at its apex. Superior appendage cylindrical, tapering and with its end curled inwards, its base with a broad quadrangular compressed lobe directed inwards and ventrally. Inferiors broad at base, tapering to apex, which is acute and curled inwards and slanted slightly upwards. Penile organ scarcely differing from that of *P. lachrymosa*.

Samoa: Hellesoi's Paddock, 1600 ft., Apia, 19.viii.51, 1 ♂ (type) (*Dr. J. Armstrong*).

The highly specialised pterostigma of the fore wings will serve to distinguish this species from any other of the Ischnurine complex, whilst its shape and bicolorous nature will determine it from the all-black pterostigma of *P. lachrymosa*.

Among the large number of females sent by Dr. Armstrong, I have found only one which might be the opposite sex of *dolorosa* and which certainly does not belong to any other of the nine known Samoan Ischnuras. Its description follows:

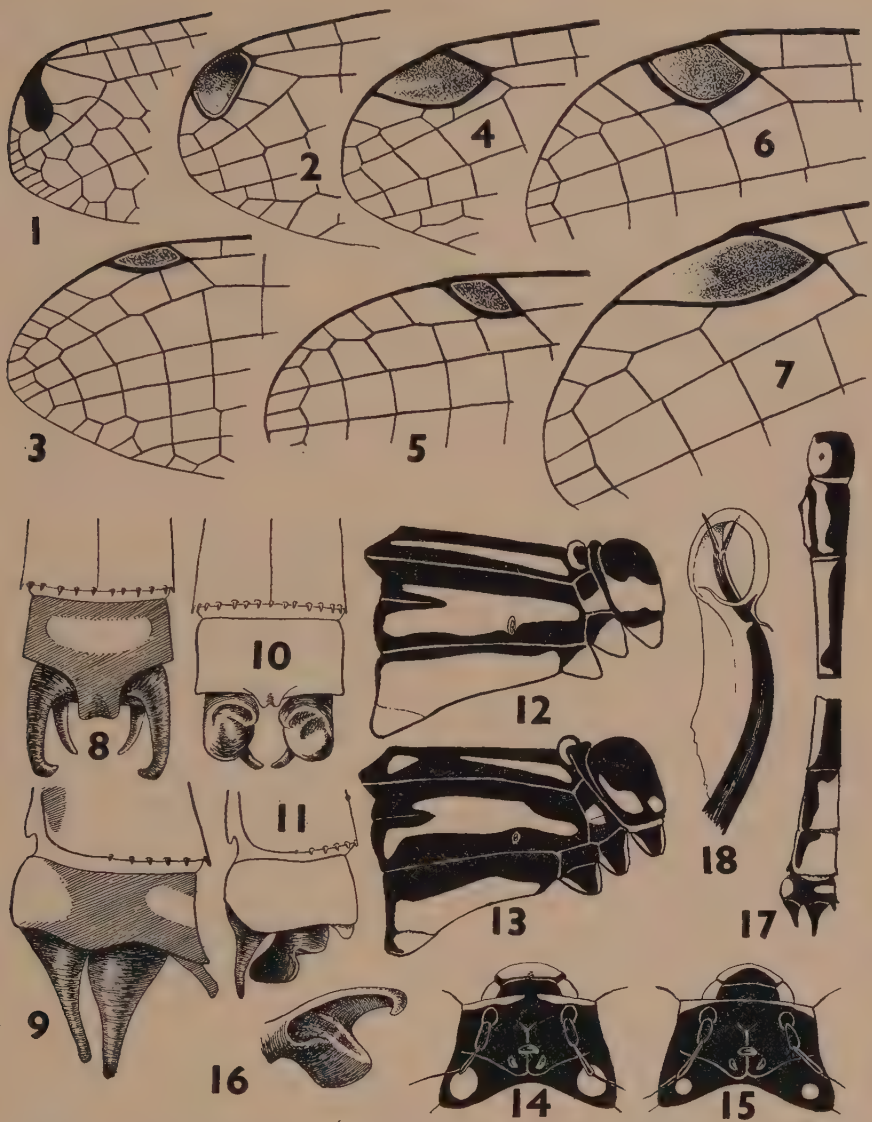
Female (by supposition).—Abdomen 26·5 mm. Hind wing 20 mm. Head: Labium bleached yellow, labrum greenish, its base broadly black; anteclypeus greenish, postclypeus black; frons, genae and bases of mandibles pale greenish-yellow, rest of head bronzed black, the occiput with rather small bluish postocular spots. Prothorax black on dorsum and upper parts of sides, pale greenish below; posterior lobe depressed, widely arched, black with a small greenish yellow spot at each end. Thorax bronzed black on dorsum to a short distance posterior to humeral suture; complete greenish antehumeral stripes. Laterally bluish green or greenish with a small black spot under fore wing and a second more prolonged on the upper part of the posterolateral suture. Legs greenish yellow; extensor surfaces of femora and tibiae broadly black. Wings hyaline; 16 postnodals in fore wings, 13 in the hind (there is an extra costal antenodal distal to the distal antenodal in the right fore wing—a very rare aberration). Pterostigma of nearly the same size in all wings, subquadrate; proximal side very oblique, costal side the shortest; distal and posterior sides forming a continuous convexity, framed in thick black veins and with a dark greyish centre, covering one cell; veins distal to pterostigma forming in part two rows (as in *P. lachrymosa*, although not to the same extent). Abdomen bronzed black on dorsum from segment 1 to 8, the apical border of the latter segment and the whole of segments 9 and 10 except for narrow basal black annules, azure blue. Anal appendages shortly conical, black.

This female differs most from the male by the absence of the thick black stripe on the posterior suture of the thorax, which seems to throw some doubt as to its correct determination. The only other possibility is that it may belong to some yet undiscovered species.

Pacificagrion lachrymosa Fraser (fig. 1).

The collections contain another pair of this rare and remarkable species.

Male.—Slightly smaller than previous two, abdomen 30 mm. and hind wing 20 mm. Nodal index correspondingly lower; 16 postnodals to fore wings, 13 in the hind, but otherwise it does not differ from type apart from slight variation in the cross-veins at apex of fore wings. *Female*.—Abdomen 29 mm. in length and hind wing 22 mm. A much larger



FIGS. 1–18.—Apices of wings of (1) *Pacificagrion lachrymosa* Fraser, male, forewing. (2) The same of *Pacificagrion dolorosa* sp. n. (3) Hind wing of same species. (4) *Ischnura sanguinostigma* sp.n., male, fore wing. (5) The same of hind wing. (6) *Ischnura haemastigma* Fraser, male, fore wing. (7) *Ischnura albistigma* Fraser, male, fore wing. (8) and (9) Male anal appendages of *Pacificagrion dolorosa* sp. n., dorsal and left lateral aspects. (10) and (11) Male anal appendages of *Ischnura sanguinostigma* sp. n., dorsal and left lateral aspects. (12) Thorax of *Pacificagrion dolorosa* seen from the right side. (13) The same of *Ischnura sanguinostigma*. (14) Dorsal view of head of *Pacificagrion dolorosa*. (15) The same of *Ischnura sanguinostigma*. (16) Superior anal appendage of the male of *Pacificagrion dolorosa* viewed from the inner side. (17) Left lateral view of abdomen of *Pacificagrion dolorosa*, segments 1 to 3 and 7 to 10. (18) Penile organ of *Ischnura sanguinostigma*.

and more robust insect than the male ; colour and markings closely resemble those of male save that the stripe on the posterolateral suture of the thorax is poorly defined and terminal segments of abdomen are dark, but this latter is probably due to post-mortem changes, as the specimen is both rather teneral and discoloured. Wings hyaline ; 19 postnodals in fore wings, 15 to 16 in the hind ; pterostigma of fore wing subquadrate, distal and proximal sides convex, costal border markedly sunk beneath the level of the costa preceding it so that the costa is distinctly sinuous at this point ; the pterostigmal brace sharply angulated to the end of Rii and not continuing its line as in the male ; 2 rows of cells follow the pterostigma in all wings and there is a short length of 2 rows between the ends of Ri and Rii. The pterostigma of hind wing normal in shape, rather elongated and with very acute distal angle. Ventral spine of segment 8 almost obsolete ; ovipositor robust, yellowish ; anal appendages shortly conical, black.

♂, Samoa : Apia, Malietoa's meadow stream, Vaisigano river, 19.viii.51 ; ♀, Fulaoson river above the Morris Dam, 7.x.51,

Ischnura albistigma Fraser (fig. 7).

This species was described from two males, one from Pago Pago, Tutuila island, and the other from Malololelei, Upolu island, the female being so far unknown. Dr. Armstrong has now found the species fairly plentiful in Apia and has secured specimens of the female, which is here described.

Female.—Abdomen 26 to 28 mm. Hind wing 20 to 21 mm. Very similar to the male in colour and markings. Differs as follows : Postocular spots are mere points or quite obsolete ; bluish ground-colour replaced by bluish green or greenish. Abdominal segments 8 to 10 marked with blue and black ; 8 with a broad apical annule or an apical spot shaped like a trefoil leaf, 9 with the whole of dorsum, its sides very broadly black, 10 almost entirely blue but with a thin laterobasal black stripe. Wings hyaline ; 14 postnodals in fore wings 12 in the hind ; only a single row of cells distal to the pterostigma, which latter is shaped like an elongated diamond with inner and outer angles very acute, the distal one especially prolonged ; pale yellow framed in thick black veins and with dark centre. The pterostigma of hind wing similarly shaped and coloured, but usually distinctly smaller.

This female is rather smaller than that of *Amorphostigma auricolor* Fraser, with which it might be confused, but it may be distinguished at once by its black postclypeus (unmarked in *auricolor*).

Ischnura haemastigma Fraser (fig. 6).

This species was described from a single male from Malololelei, Upolu Island, taken by Professor P. A. Buxton, 5.xii.25. Dr. Armstrong has rediscovered it in Apia and has sent me 16 males and 4 females, this sex being hitherto unknown. Some amplification and corrections of the original description of the male are made here and the female is described.

Male.—Abdomen 23 to 26 mm. Hind wing 15 to 16 mm. Postclypeus glossy black at base ; frons black at its centre but citron yellow laterally, this colour being continuous with that of the bases of mandibles and genae ; the basal segments of antennae also yellow. Beneath head black bordered narrowly with white against the eyes. Posterior lobe of prothorax but slightly raised, broadly and shallowly arched, its border bearing two small notches which render it subtrilobate ; below and posterior to this lobe is a thin plaque almost flush with the lobe itself, which latter is black with a small point of yellow at each end. Antehumeral stripes usually almost obsolete, especially in old adults, and represented

by a small upper spot and a lower triangular one. The lower parts of the sides of thorax and beneath, as well as the legs, are more carneous than bright crimson (as described in the original paper). The pterostigma of the fore wing covers about four times the area of that of hind wing, which is very small, regularly diamond-shaped, golden yellow with blackish centre and thick, black framing nervures ; it is distinctly pale red or pinkish by reflected light. Segment 9 of the abdomen, in some specimens, has the posterior (apical) border more or less broadly black and the dorsal spot on segment 10 is absent or may be reduced to a tiny basal point.

Female.—Abdomen 23 mm. Hind wing 18 mm. A more robust insect but marked closely similar to the male. The paler parts are more yellow than carneous and the post-ocular spots are obsolete or almost so. The posterior lobe of the prothorax is rather broader but similar in structure. The antehumeral stripes show some variation ; in tenerals they are complete but the connecting part is of a hair-like thinness ; in adults the upper spot is elongate and linear but always widely separated from the lower triangular portion. The legs are yellowish instead of carneous and the femora are broadly black on the extensor surface, whilst, in some adults, the tibiae show a diffuse incomplete blackish annule at the proximal ends. Wings hyaline, 13 to 14 postnodals in the fore wings, 11 in the hind ; pterostigmas unequal in the fore and hind wings, but in both diamond-shaped ; that of fore wing much the larger, with distal and posterior sides forming a single convexity, yellowish with darker greyish centre but distinctly pink by reflected light. Abdomen greenish black metallic on dorsum and subdorsum throughout, greenish yellow ventrally on basal segments changing to ochreous on the others. Anal appendages shortly conical, black, divaricate ; vulvar scale pale ferruginous.

Samoa : Apia, Vailima stream, 21.x.51, 24.xi.51, 14.x.51 : Malietoa's meadow stream, Vaisigano River, 19.viii.51, and middle branch of same stream, 14.x.51.

This was hitherto the only Samoan species with a blood-red pterostigma, but Dr. Armstrong has discovered a second and new species with the same character so that it becomes necessary to note the differences separating them. In *haemastigma*, in both sexes, in adults, the antehumeral stripes are represented by small upper and lower spots, the sides of the thorax and the legs are bright carneous, whilst the underneath of the former is immaculate. In the new species, *sanguinostigma*, the antehumeral stripes are less interrupted (complete always in the female), the sides of the thorax and beneath, as well as the legs, are broadly marked with black. Lastly the pterostigma of the forewing of *haemastigma* is nearly quadrate, whilst that of *sanguinostigma* is more nearly diamond-shaped.

Ischnura sanguinostigma sp. n. (figs. 4, 5, 10, 11, 15 and 18).

Male.—Abdomen 23 mm. Hind wing 14·5 mm. Head : Labium pale white, labrum greenish yellow, black at base, this latter rather diffuse and fading anteriorly ; anteclypeus and genae pale greenish, the latter changing to ochreous above and extending on to the lateral parts of the frons ; the latter at its middle and the whole of vertex and occiput matt black with two very small, round, bluish postocular spots ; beneath head matt black with a fine pale line against the eyes. Prothorax black marked with pale yellowish green laterally as a posterior sinuous stripe and two small closely apposed spots anteriorly, posterior lobe broadly and flatly rounded, depressed. Thorax black on dorsum to as far the middle of mesepimeron marked with narrow, broadly interrupted antehumeral stripes greenish yellow in colour but possibly becoming blue later on during life. Laterally bright citron yellow or green with a short upper stripe of black on the antero-lateral suture,

which is almost entirely confluent with the dorsal black as it spreads on to the sides; a very broad black stripe centred over the second lateral suture, so that the pale coloured portion is much reduced. Legs black with the flexor surfaces of femora bright yellow. Wings hyaline, pterostigma differing in shape in the two wings, that of fore wing covering about four times the area of that of hind and blood-red by reflected light, paling distally, but a beautiful peach-blossom tint by direct light changing to a very dark tint at the proximal angle; outer and inner sides very oblique, the outer and posterior sides in a continuous curve, the costal border slightly sunken so that the costa is slightly sinuous at this level. Pterostigma of hind wing very small, a miniature of the fore wing's and of the same approximate shape, framed in black with blackish centre on a reddish background, covering less than one cell. In the fore wing the radius is continued after the pterostigma for only 2 cells (4 cells in *haemastigma*, which has a uniformly blood-red pterostigma in the fore wings); 11 postnodals in fore wings, 10 in the hind (usually 13 in *haemastigma* and 10 to 11 in the hind). Abdomen black on dorsum from segments 1 to 7, segments 8 to 10 entirely azure blue; narrow yellow rings at the bases of segments 2 to 7, a large yellow spot on the sides of segment 1, baso- and apicolateral spots with a short yellow streak between them on the sides of segment 2 and the whole of the sides and beneath of segments 3 to 7 pale yellow. Anal appendages black, shorter than segment 10, the inferiors, which are slightly longer than the superiors, tapered to a point which is curled evenly inwards. The superiors broad and cylindrical in the basal third, from which springs a broad, rounded lobe on the outer and ventral side which is deeply concave on its inner side. Apicodorsal border of segment 10 slightly raised and minutely emarginate. Penis similar to that of *haemastigma*.

Female.—Abdomen 22 mm. Hind wing 16 mm. A dark species like the male, but more robust and differing but little in its markings. The postocular spots absent (no trace is visible in either of the two specimens before me, the whole vertex and occiput a glossy black and not apparently the effect of post-mortem decomposition). Prothorax similar to the male, but the posterior lobe wider and less emarginate. Mesostigmal lamina horns black. Antehumeral stripes complete and of a greenish-yellow colour; a complete broad black stripe on the postero-lateral suture. Legs black, only the extensor surfaces greenish yellow. Wings hyaline, 14 to 15 postnodals in fore wings, 12 in the hind; pterostigma of normal diamond-shape in all wings but that of fore wing covering about twice the area of that of hind, acute both proximally and distally but produced more in the latter direction; both of a pale cherry-red. Abdomen black on dorsum throughout, yellowish or greenish below, the intersegmental nodes yellow. Anal appendages shortly conical, black. Ovipositor yellow.

Samoa: Apia, from the Moa Moa stream, 1.ix.51, 1 ♂ (type) 26.v.31, 2 ♀.

The only species with which this beautiful insect may be confused is *I. haemastigma* Fraser, which also has a bright red pterostigma. The distinguishing characters have already been detailed under the description of *haemastigma* above, but it may be mentioned again that, whilst the pterostigma of *sanguinostigma* is an elongate diamond, that of *haemastigma* is almost quadrate.

Ischnura buxtoni Fraser.

Among a great number of females collected by Dr. Armstrong, most of which belong to *Amorphostigma armstrongi* Fraser, there is a species which is said to differ from all other females by its generalised khaki colour during flight. This is said, by its collector, to be due to the yellowish antehumeral stripes, and the sheen of the dark bronzed parts of the body. The females of all other species now having been determined satisfactorily, I have determined this species as *buxtoni* by a process of elimination.

In my original description of *Ischnura buxtoni* I had two males and seven females before me, all from Malololelei, Upolu, W. Samoa, but I now think that these latter may be actually the opposite sex of *A. armstrongi*, the differences being due to age states. The excess of females over males in a rare species is suspicious and is almost certainly due to wrong determinations, facilitated owing to the close similarity of the females of different species. I have before me four males of *buxtoni* taken in Apia together with two females ; Vailama stream, above Vailama, 21.x.51 ; Moa Moa stream, 700 ft., 26.v.51 and Vaisigano river, 1900 ft., 5.i.52. The males are all typical of the Upolu ones ; the female is described below :

Female.—Abdomen 23 mm. Hind wing 17 mm. Head : Labium bleached yellow, almost white ; labrum olivaceous, broadly black at base ; anteclypeus pale olive, postclypeus black ; genae, bases of mandibles and frons as far as the roots of antennae, including the pedicel of the latter, pale greenish or greenish yellow ; rest of head dull coppery metallic black but with large triangular dull ochreous postocular spots on occiput. Beneath head black but the eyes margined broadly with yellow. Prothorax black on dorsum, pale on sides ; posterior lobe depressed, broadly arched, shallowly and broadly emarginate at the middle, black with a spot of yellow at each end. Thorax dull bronzed black on dorsum to as far as the mid line of mesepimeron and with broad, complete khaki-coloured antehumeral stripes. Laterally dull yellow with a broad complete black stripe on the posterolateral suture ; black beneath. Legs yellow, broadly black on extensor surfaces of femora and tibiae. Wings hyaline, 12 to 13 postnodals in fore wings, 11 in the hind ; pterostigma long and narrow, rather more than half as long again as broad, very acute at distal and proximal ends, dull olivaceous framed in black nervures and centred with greyish. Abdomen dull bronzed black on dorsum throughout, ochreous beneath and on the lower parts of sides, this passing dorsally on segments 3 to 6 to form narrow basal interrupted rings ; a small spot of yellow on each side of dorsum of segment 9. Anal appendages very short, conical, black, ovipositor ochreous.

This female is distinguished from others in the same genus by its long narrow pterostigma and by the dull ochreous antehumeral stripes.

Agriocnemis interrupta Fraser.

I described this species from a single male collected in Upolu, W. Samoa, by Dr. Armstrong, who has now rediscovered it in Apia and sent me 5 males and 2 of the hitherto unknown female. I have re-examined this species to see if it should be separated from genus *Agriocnemis* or removed to *Argiocnemis*, since its large size renders it an anomaly in the former and its close venation suggests it might belong to the latter. However, abiding strictly by the Selysian generic definitions, it is seen that the characters are preponderatingly those of *Agriocnemis* ; thus 1A ends before the origin of Riii, and CuP ends before the origin of IRii, whilst the lobes of the labium are close together and the labrum of the male is brilliantly metallic.

Dr. Armstrong describes the new habitat in which he found the species in Apia : " An overgrown bog-hole full of water and almost completely submerged and concealed in the surrounding bush ; the walls of this hole were of volcanic clay and the hole itself had been formed by an American tank which had become bogged when attempting to cross the island. After its extrication a hole some 20 feet long and 8 feet wide was left, 8 feet deep at its end and with the bottom covered by rotting vegetation." This suggests that the colony was of compara-

tively recent formation and that the species is only able to flourish where competition is low or non-existent.

Female.—Abdomen 26 mm. Hind wing 18 mm. Head: Labium yellowish, labrum pale ochreous or possibly bluish during life, marked with a short medial tongue of black at the base; bases of mandibles and genae glossy azure blue, epistome and rest of vertex and frons dull bronzed black, the occiput bearing large rounded blue postocular spots; beneath head uniformly pale. Prothorax black on dorsum, its sides obscurely blue, the posterior lobe produced medially as in the male and forming a conspicuous projection as viewed in profile with its dorsum hollowed out and its sides curled strongly up. Thorax black on dorsum and bearing similar interrupted blue antehumeral stripes as in the male; the sides blue changing to yellow beneath. Legs yellow with black spines and with a black stripe on the extensor surface of the femora. Wings hyaline, 12 postnodals in the fore wings, 10 in the hind; pterostigma olivaceous with greyish centre, rather longer than broad, acute distally, distal and posterior sides forming a continuous convexity, the proximal side very oblique. Abdomen black on dorsum from segment 1 to 6 and base of 7, the rest ferruginous as in the male (the specimens before me have largely faded in these segments from post-mortem changes, but Dr. Armstrong states that in life they are as brightly reddish as in the male). Beneath abdomen and basal rings on segments 3 to 7 yellowish. The anal appendages pale yellow, shortly conical.

Samoa: Bog-hole on Afiamalo, Siumu track, 15.i.52; on the same track, 2000 ft., 30.xii.51; Aopo track, 5.vii.51; Vaisigano river, 1900 ft., 5.i.52; Hellesoi's paddock, Afiamalo road, 16,000 ft., 23.xii.51.

References.

Fraser, F. C., 1926, *Trans. ent. Soc. Lond.*, **1925**: 505.
——, 1927, *Insects of Samoa*, **7** (1): 19. British Museum (Natural History).

CHIRONOMIDAE (DIPTERA) FROM WESTERN CAPE PROVINCE—I

By Paul Freeman, M.Sc., F.R.E.S.
(*British Museum, Natural History.*)

The insects described below were nearly all collected by Dr. K. M. F. Scott of the University of Cape Town in connection with a survey of the Berg River, Cape Province; some of them were bred from larvae. Dr. Scott has been kind enough to present the holotypes of new species and most of the collection to the British Museum; paratypes wherever available have been placed in the Cape Town Museum. In the details of the specimens following the descriptions I have given the collectors' names only when the specimens were not collected by Dr. Scott.

In the tropical parts of Africa species of the subfamily Orthocladiinae seem to be few, but a notable feature of this collection is the high proportion of species of this subfamily. They also reappear in the mountainous regions of East Africa, and can be placed in the same species groups and genera as species from the Palaearctic Region. Another interesting feature is the wide distribution of some of the species.

The subfamily Diamesinae has not been recorded from the Ethiopian Region and there are no specimens belonging to it in the present collection. The subfamily, however, does occur in the Region because the late Dr. F. W. Edwards took some specimens of a species of *Diamesa* at 10,000 ft. in Namwamba Valley, Ruwenzori, and there is material of another species in the British Museum from Kilimanjaro (*R. G. Tapley*). It is quite likely that species of Diamesinae will eventually be found in the Cape.

In the specific descriptions the terms A.R. and L.R. mean antennal ratio and leg ratio as used by Edwards (1929, *Trans. ent. Soc. Lond.* **77** : 283–284). The antennal ratio is the length of the last segment of the male flagellum in relation to the free basal segments. The leg ratio is the length of the first segment of the tarsus in relation to the tibia, and unless otherwise stated always refers to the front legs. Tarsal beard refers to the long hairs often present on the front tarsi. For the wing venation I am adopting the Comstock-Needham system as modified by Tillyard. Under this modification the posterior fork, known to Edwards and others as the cubital fork, is regarded as being compound: the anterior branch is considered to be M_{3+4} and the posterior branch to be Cu_1, whilst Cu_2 is reduced to a fold running immediately behind Cu_1. It will be appreciated that the cross-vein known to Edwards as m–cu now becomes the base of M_{3+4}, the true cross-vein being the apparent base of this vein.

Pentaneura Philippi.

Pentaneura Philippi, 1865, *Verh. zool.-bot. Ges. Wien* **15** : 629; Edwards, 1929, *Trans. ent. Soc. Lond.* **77** : 287.

Ablabesmyia Johannsen, 1905, *Bull. N.Y. St. Mus.* **86** : 135; Goetghebuer, 1935, *Rev. Zool. Bot. afr.* **27** : 356.

Tanypus (Meigen) Kieffer, 1923, *Ann. Soc. ent. Fr.* **92** : 192.

I have studied the figure given by Philippi of the wing venation of *Pentaneura grisea* and I fully endorse Edwards' views; I am, therefore, following his interpretation (1929) of the genus.

Pentaneura dusoleili Goetghebuer.

Ablabesmyia dusoleili Goetghebuer, 1935, *Rev. Zool. Bot. afr.* **27** : 359.

6 ♂, 8 ♀, Berg River, Hermon and Wellington, v–vi and xi.1952.

In the original description of this species Goetghebuer mentions the presence of two spots in cell M_1, but only one is shown in his figure, similarly he mentions three spots in the anal cell but he figures only two. Until the type can be examined I am assuming that Dr. Scott's specimens belong here because of

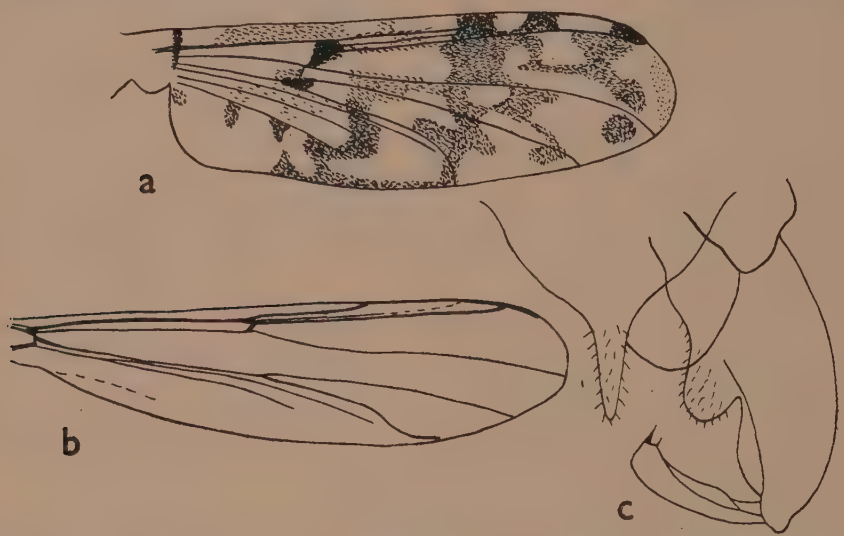


Fig. 1.—(*a*) Wing of *Pentaneura dusoleili* female; (*b*) wing of *Metriocnemus scotti*; (*c*) male hypopygium of same.

the similarity of the leg coloration and the remainder of the wing spots, especially the big one in cell R_5.

The wing pattern (fig. 1*a*) is variable, and any given spot may be larger or smaller in individual specimens. The shape of the spots in cell R_5 is fairly typical. The leg bands also show some variation. The femora may be mainly dark with a sub-apical white band followed by a broad black apex, or they may simply have a subapical black band. The tibiae were described by Goetghebuer as having three black bands, the first placed beyond the base; there is often in addition a fourth dark band basal to this one. In the male the first five abdominal segments are pale.

This seems to be a widespread and common species. There are specimens in the British Museum from Abyssinia, Kenya, S. Rhodesia, Belgian Congo (Kivu) and Natal.

Pentaneura nigromarmorata Goetghebuer.

Ablabesmyia nigromarmorata Goetghebuer, 1935, *Rev. Zool. Bot. afr.* **27** : 361.

1 ♂ from Berg River, Hermon, is being provisionally placed here until it can be compared with the holotype (a female).

Pentaneura comata sp. n.

A minute black species without pale markings belonging to the group *Nilotanypus* characterised by retracted costa, absence of R_{2+3}, wide separation of cross-veins, and pubescent eyes. Separated from the only other known Ethiopian species of this group, *P. remotissimus* Kieffer, by the darker coloration and the uniform covering of dark hairs all over the wing.

Male.—Wing length 1·0–1·4 mm.

Head black with greyish pruinosity; antennae with black plumes, A.R. about 1·0; eyes clothed with short pubescence, separated dorsally by about twice their apical width. *Thorax* black, mesonotum with four broad stripes marked out in brownish-grey pruinosity, all hairs black. *Legs* translucent brown, with dark hairs and no markings; anterior tarsi with no beard, L.R. 0·6; L.R. of middle legs 1·25, of hind legs 1. *Wings* hyaline, unmarked, membrane evenly clothed, except in basal cell, with dark macrotrichia; costa retracted, ending before tip of M_{3+4} (Cu_1 of Edwards); R_{2+3} apparently absent, true base of M_{3+4} well basal to r–m. *Halteres* with pale knobs. *Abdomen* black, terminalia bearing long black hairs.

Female.—Similar to male.

Holotype, male, Berg River, Piquetberg, 9.ix.52; paratypes, 2 ♂, 1 ♀, same locality, 18.xii.52.

Procladius Skuse.

Procladius Skuse, 1889, *Proc. Linn. Soc. N.S.W.* (2) **4**: 283; Edwards, 1929, *Trans. ent. Soc. Lond.* **77**: 300.
Trichotanypus Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 189; Goetghebuer, 1935, *Rev. Zool. Bot. afr.* **27**: 542.

I am following Edwards's interpretation of the limits of this genus.

Procladius brevipetiolatus Goetghebuer.

Trichotanypus brevipetiolatus Goetghebuer, 1935, *Rev. Zool. Bot. afr.* **27**: 355

1 ♂, Berg River, Daljosaphat, 15.v.52; 1 ♂, Kirstenboschen, 14.x.52; 1 ♀, Berg River, 22.x.52; 1 ♂, Bergvliet, 12.xi.52.

The specimens agree with Goetghebuer's description except that in the female thorax all the stripes are fused. It seems probable that in his description, "Cu_1 nearer the wing tip than R_{4+5}," he may well have been looking at M_1.

Metriocnemus scotti sp. n.

Mesonotal stripes separated, halteres yellow; wings of both sexes thickly clothed with macrotrichia over whole surface, readily distinguishing it from the only other described Ethiopian species, *M. dewulfi* Goetghebuer.

Male.—Wing length 1·75–2·0 mm.

Head.—Yellow, mouthparts darker, pedicel dark brown, A.R. about 0·8. *Thorax*: Ground-colour yellow; mesonotal stripes separate, brown, central one more or less divided

longitudinally, intervening spaces and shoulders pruinose; scutellum yellowish; postnotum and sternopleuron brown. *Legs* yellowish brown, unmarked, hairy; L.R. 0·75, segment 4 of tarsus one and a half times as long as segment 5; L.R. of hind leg 0·6; pulvilli absent. *Wings* hyaline, macrotrichia present quite thickly over most of surface, absent for a narrow tract along each vein so that in the basal half of the posterior fork there is only a single row. Costa clearly produced; R_{2+3} difficult to see as it lies close to R_{4+5}, ending about two-thirds of distance between R_1 and R_{4+5}; posterior fork directly below r–m (fig. 1*b*); M_{3+4} ending below tip of R_{4+5}; Cu_1 curved and bent; An reaching well beyond posterior fork, anal lobe obtuse; squama with fringe of about 8 hairs. *Halteres* pale. *Abdomen* brown; hypopygium as in fig. 1*c*, not unlike that of *M. dewulfi*.

Female.—Wing length 2·0 mm.

Resembles male, wing hairs denser; basal half of posterior fork with two or three rows.

Holotype male and 2 ♀ paratypes, Cape Province, Kirstenbosch: 29.iv.52; 1 ♂, 1 ♀, paratypes Abyssinia: Dessie, 25.xii.1935–15.i.1936 (*J. W. S. Macfie*).

Cricotopus van der Wulp.

Cricotopus van der Wulp, 1874, *Tijdschr. Ent.* **17**: 132; Edwards, 1929, *Trans. ent. Soc. Lond.* **77**: 317; Goetghebuer, 1934, *Rev. Zool. Bot. afr.* **25**: 200.
Trichocladius Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 182.

I am following Edwards's definition and interpretation of this genus to include those species with hairy eyes and greatly reduced dorso-central hairs. The type of the genus was fixed by Coquillet as *C. tibialis* Meigen.

Cricotopus fulgens sp. n.

Black, thorax shining, abdomen mostly brilliantly shining, anterior tibia with white ring, tarsi yellow, wing veins seamed with brown, halteres black. Allied to *C. kisantuensis* Goetghebuer but distinguished by the presence of shining bands on segments 2, 8–9 of abdomen and by the yellow tarsi.

Female.—Wing length 1·75–2·0 mm.

Head.—Vertex shining black, face brown, mouthparts black; antennae dark brown, 6-segmented, apical segment rather longer than preceding two. *Thorax* jet black; prothorax, mesonotum, postnotum, pleura and sternopleura brightly shining, scutellum matt; pleural membrane slightly brown tinged. *Legs* black, tarsi and trochanters yellowish brown, anterior tibia with a pure white ring situated a quarter to half the length of the tibia from its base and occupying about a third of its length; pulvilli absent; L.R. about 0·6. *Wings*: Veins seamed with brown, R_{2+3} ending midway between R_1 and R_{4+5}, costa slightly produced, M_{3+4} ending below R_{4+5}. *Halteres* black. *Abdomen* black, cerci bright yellow; segment 1 completely shining, 2 shining on basal third, 3 shining on basal half to two-thirds, 4 completely shining, 5 all matt, 6–9 shining except for extreme apical margins; all hairs black.

Holotype, female, Berg River, Wellington, 21.v.52; 3 ♀ paratypes, Gold Coast, Senchi, 1951 (*M. H. Hughes*).

Dr. Hughes's specimens were bred from a culture of *Simulium damnosum* and *griseicolle*; he suggests that they are the adults of a chironomid larva commonly associated with *Simulium* early stages.

A male from Kenya, Aberdare Range, closely resembles this species but has a white band on the middle tibia as well as on the anterior and the claspers are

dark. I am, therefore, not associating them until more material becomes available.

Cricotopus bicinctus var. *plumbeus* Goetghebuer.

Cricotopus bicinctus var. *plumbeus* Goetghebuer, 1934, *Rev. Zool. Bot. afr.* **25** : 201.

13 ♂, 10 ♀, Berg River, Wellington, 20.v.52.

This is virtually indistinguishable from the European *C. bicinctus* Meigen ; such differences as exist lie in the colour of the two abdominal pale bands, which tend to be leaden rather than yellow.

Cricotopus flavozonatus sp. n.

Distinguished from other species by the presence of yellow bands on segments 1, 2, 4 and 5 of abdomen.

Male.—Wing length 2·3 mm.

Head blackish, face pale, mouthparts black, antennae black, A.R. about 1·0. *Thorax* shining ; mesonotum mainly blackish or pitchy ; the three stripes are fused but can be just distinguished by their slightly darker colour, prothorax, shoulders and mesonotal margins yellow ; pleura, scutellum, postnotum black. *Legs* mainly brown, bases of all femora and anterior coxae yellow ; anterior tibia with basal fifth blackish, followed by a pure white ring about one-third length of tibia, remainder dark brown ; middle tibia similar but white not so clearly defined ; posterior tibia with only a trace of a paler ring ; all tarsi brown, L.R. about 0·7 ; pulvilli absent. *Wings* not distinctly milky, R_{2+3} reaching costa nearer to R_5 than R_1, posterior fork beyond cross vein ; anal lobe obtuse, squama fringed. *Halteres* whitish yellow. *Abdomen* black with yellow basal bands on segments 1, 2, 4, 5, claspers yellow ; yellow bands progressively wider, those at base occupy little more than one third of segment, that on fifth occupies nearly two-thirds. Hypopygium (fig. 2*a*) lacking anal point, coxite with small process, style with inner membranous extension.

Female.—Wing length 2·5 mm.

Resembles male, but yellow abdominal markings and white leg rings much less distinct ; terminal antennal segment nearly as long as preceding three. Markings on abdominal segments 1 and 2 practically absent but can just be distinguished, those on 4 and 5 duller than in the male, cerci yellow. Legs appear at first glance to be all brown except for the bases of the femora ; closer examination shows pale brown areas where the white rings of the male are situated.

Holotype male and paratypes 1 ♂, and 1 ♀, Berg River, Wellington, 20–21.v.52 ; 1 ♂, Berg River, 29.ix.52 ; 1 ♀, Bergvliet, 28.x.52.

Cricotopus obscurus sp. n.

A dark species lacking abdominal and leg markings, separable from the following species by the structure of the male hypopygium and by the larger size.

Male.—Wing length 2·0 mm.

Head black, mouthparts black, antennae and plumes black, A.R. about 1·0. *Thorax* shining but not brilliant, mesonotum with three black stripes on a brown or yellowish background, shoulders and lateral margins more yellowish ; upper half of pleura yellowish, remainder of pleura and sternopleura black ; scutellum brown, postnotum black. *Legs* uniformly pale brown, L.R. 0·6, pulvilli absent. *Wings* slightly milky, R_{2+3} reaching costa nearer to R_{4+5} than to R_1, posterior fork beyond cross-vein ; anal lobe right angled,.

squama fringed. *Halteres* with dark stems and brownish knobs. *Abdomen* uniformly blackish. Hypopygium black, anal point absent (fig. 2*b*); coxite with inner thumb-like process, style without inner membranous extension.

Female.—Wing length 2·0 mm.

Very similar to male in colouring, pleura of thorax perhaps more yellow, femora slightly darker than the rest of the legs.

Holotype, male, and 5 ♂, 2 ♀, paratypes Berg River, Wellington, 20–21.v.52; 1 ♂, Piquetberg, 9.ix.52.

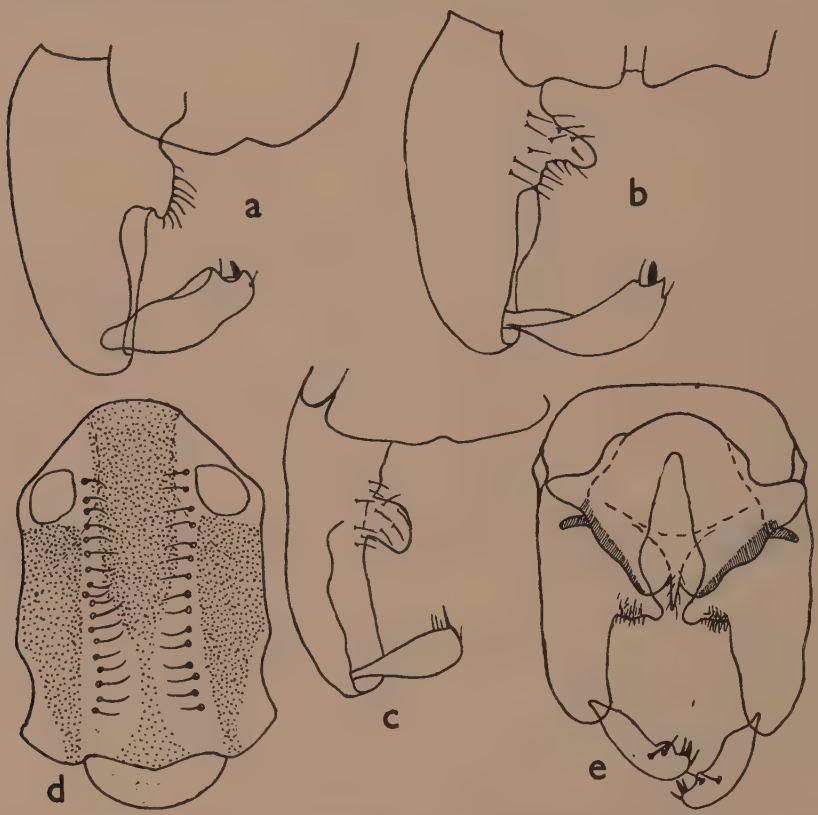


Fig. 2.—*Cricotopus* and *Trichocladius* spp. (*a*) Male hypopygium of *C. flavozonatus*; (*b*) the same of *C. obscurus*; (*c*) the same of *C. angustus*; (*d*) dorsal view of thorax of female *T. capensis*; (*e*) male hypopygium of *T. capensis*.

Cricotopus angustus sp. n.

Very similar to *C. obscurus* sp. n. but rather smaller and differing in the male hypopygium.

Male.—Wing length 1·4 mm.

Head yellowish, brown on vertex; mouthparts black, A.R. about 1·0. *Thorax* with ground-colour yellowish, mesonotum with three dark brown stripes, scutellum yellow, postnotum and sternopleuron dark brown, pleura rather greyish; whole thorax slightly pruinose, not so markedly yellow as *obscurus*; L.R. about 0·6, pulvilli absent. *Wings* slightly milky, R_{2+3} ending nearer to R_1 than to R_{4+5}; posterior fork beyond cross-vein; anal lobe

obtuse, squama fringed. *Halteres* with brown stems and yellow knobs. *Abdomen* uniformly blackish. Hypopygium black ; anal point absent (fig. 2*c*) ; coxite narrow with well developed inner process of a different shape from that of *obscurus* ; it also appears to be rather more strongly sclerotised ; style broader, no inner membranous extension, short, apical spine long and narrow.

Female not known.

Holotype, male, Berg River, Piquetberg, 30.x.52 ; paratype 1 ♂, same locality, 26.xi.52.

Trichocladius capensis sp. n.

I am following Edwards in his use of the genus *Trichocladius* for those species with hairy eyes which have well developed dorso-central bristles, and often unusually large humeral pits.

Thorax shining, stripes black, separated in the female, more or less fused in the male, humeral pits very large, halteres brown.

Male.—Wing length 1·75–2·0 mm.

Head black, mouthparts black, antennae and plumes black, basal antennal segment pruinose, A.R. about 1·0. *Thorax* brightly shining with three prominent black stripes which are more or less fused, the intervening areas being brown rather than black ; humeral pits large and dorso-central bristles well developed (see fig. 2*d* of female), shoulders including pits yellow ; stripes may have a slight bluish reflection in certain lights ; prothorax partially yellow, scutellum brownish, postnotum black, pleura yellowish, sternopleura black. *Legs* brown, paler at base of femora, darker on tarsi and at knees, pulvilli well developed. *Wings* brownish by transmitted light, R_{2+3} meeting costa very slightly before midway between R_1 and R_5, posterior fork distinctly distal to cross-vein, squama with complete fringe. Halteres with black stems and brownish knobs. *Abdomen* black, basal segments sometimes tinged with brown, especially laterally. Hypopygium (fig. 2*e*) with short hairy anal point, coxites with median protuberance, styles of even width with small rounded process near apex.

Female.—Wing length 1·9 mm.

Resembles male in general features, face paler, antennae 6-segmented, apical segment as long as 4 and 5 together ; ground-colour of thorax yellow, stripes well separated, central one extended to scutellum (fig. 2*d*), pleura yellow, sternopleura black ; abdomen brownish ventrally, cerci black.

Holotype, male, and 17 ♂ and 21 ♀ paratypes, Berg River, Wellington, 30.iv–21.v.52 ; 4 ♂, Berg River, Piquetberg, xii.52.

In addition there are 6 ♂, and 6 ♀, structurally identical but darker. The males have black shoulders and the stripes are completely fused, the females have yellow shoulders and stripes more or less fused as in typical males. They are probably colour varieties only but I am not considering them to be paratypes. Berg River, 1 ♂, 2 ♀, 30.vii.52 ; 1 ♀, 22.x.52 ; 2 ♂, 1 ♀, 17.xi.52 ; 3 ♂, 2 ♀, 21.xi.52.

Psectrocladius viridescens sp. n.

Thorax greenish with reddish stripes, front legs dark, halteres pale, abdomen black.

Male.—Wing length 2·4 mm.

Head greenish, mouthparts brown, antennae brown, A.R. about 1·5. *Thorax* greenish, mesonotal stripes separate and reddish, scutellum greenish, postnotum and sternopleura

dark brown. *Legs* greenish yellow, front legs dark brown except for femora, which are pale beneath; front tarsi with some indication of a beard (specimen probably abraded), L.R. 0·75; each tibia with a single spur; pulvilli broad and well developed. *Wings*: Costa slightly produced, R_{2+3} ending midway between R_1 and R_5, posterior fork beyond cross-vein, Cu very slightly curved, An reaching nearly to wing margin; anal lobe produced, squama fringed. *Halteres* pale and translucent. *Abdomen* blackish, hypopygium as in fig. 3*a*; anal point short, sharp, and hairy; coxites with triangular inner lobe, inner margin of styles straight.

Female not known.

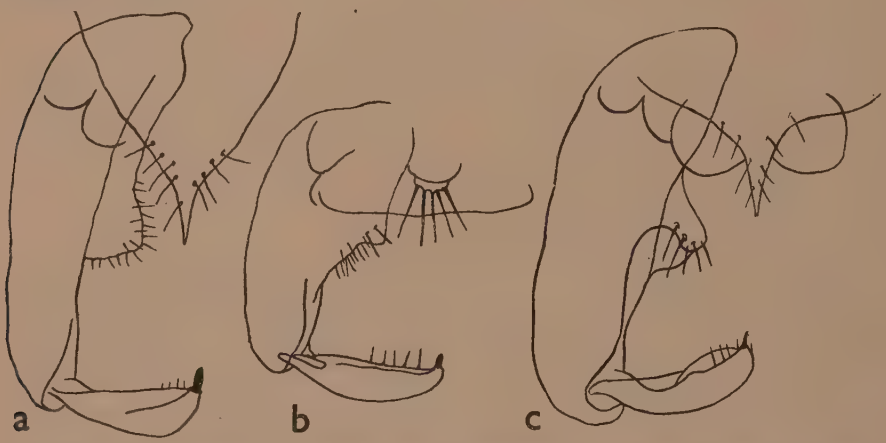


Fig. 3.—Male hypopygia. (*a*) *Psectrocladius viridescens*; (*b*) *Pseudorthocladius similis*; (*c*) *Orthocladius bergensis*.

Holotype, male, Bergvliet, 16.x.52.

Pseudorthocladius Goetghebuer.

Pseudorthocladius Goetghebuer, 1932, *Faune de France* **23**: 93; Goetghebuer, 1943, *in* Lindner, *Die Fliegen Pal. Reg.* **3**: 13, 73 (both as subgenus of *Orthocladius*); Brundin, 1949, *Inst. Freshw. Res. Drottningholm* Rept. No. 30: 726.

Spaniotoma subg. *Orthocladius* groups E and F, Edwards, 1929, *Trans. ent. Soc. Lond.* **77**: 349.

Edwards considered this division to merit only species groups of the subgenus *Orthocladius* of the genus *Spaniotoma*. Following Goetghebuer and Brundin I prefer to raise its status at least to that of a subgenus and probably to that of a genus.

Pseudorthocladius similis sp. n.

Very similar to the European species *P. curtistylus* Goet. A small black insect, wings without distinguishable microtrichia, anal point absent, empodium and pulvilli present, mesonotum yellow laterally, halteres black.

Male.—Wing length 1·5 mm.

Head brown, mouthparts and antennae, including plumes, black; A.R. about 0·9. *Thorax* black, mesonotal stripes indicated by lines of pruinosity along the line of the dorsocentral bristles; lateral mesonotal margins narrowly yellow and with some yellow on the

upper parts of the pleura. *Legs* uniformly dark brown, empodium well developed, narrow pulvilli present. *Wings* without distinguishable microtrichia, but only slightly purplish by transmitted light. Costa produced, R_{2+3} ending nearer to R_{4+5}; posterior fork well beyond r–m; M_{3+4} ending below R_{4+5}; Cu curved, An ending slightly beyond posterior fork; anal lobe indicated but obtuse, squamal fringe of 4–5 hairs. *Halteres* black. *Abdomen* black; hypopygium (fig. 3*b*) without anal point, lobe of coxite obtuse, style narrow.

Female not known.

Holotype, male, Berg River, 29.ix.52.

Orthocladius bergensis sp. n.

This species belongs to the genus *Orthocladius* in its strictest sense and is allied to the European species of the *thienemanni* group. The male is dark with a pruinose mesonotum, brown legs and yellow halteres; in the female the mesonotal stripes are separate but the thorax is again pruinose.

Male.—Wing length 2·25 mm.

Head dark, face yellow; antennal pedicel black, flagellum and plumes pale, A.R. about 1·2. *Thorax* largely dull black with grey pruinosity, prothorax yellow; mesonotum paler on lateral margins, brownish on the shoulders, stripes fused but they are sometimes rather blacker than the intervening areas and so their outlines can be made out; pleural membrane yellow, scutellum, postnotum and sternopleura black. *Legs* uniformly brown, L.R. 0·7, pulvilli absent. *Wings* somewhat brownish in transmitted light, without distinguishable microtrichia; R_{2+3} ending at about one-third distance between R_1 and R_{4+5}, costa not produced; posterior fork below cross-vein r–m which is nearly vertical, lower branch slightly arched; anal vein reaching well beyond fork, lobe not very prominent. *Halteres* yellow. *Abdomen* black, hypopygium (fig. 3*c*) with short hairy anal point, coxite with inner process, style rounded externally.

Female.—Wing length 2–2·25 mm.

Head and antennal pedicel yellow, scutal stripes separate, ground-colour of mesonotum yellow with grey pruinosity, pleura largely yellow, sternopleura black on ventral half, scutellum brown, postnotum black. Wing venation as in male, halteres yellow. Abdomen brownish.

Holotype, male and 24 ♂, 32 ♀ paratypes, Berg River, Wellington, 20–21.v.52; 5 ♀, Berg River, 30.vii. 52; 1 ♂, 14 ♀, Berg River, Piquetberg, 9–25.ix.52.

A REVISION OF THE GENUS *FENELLA* WESTWOOD (HYMEN., TENTHREDINIDAE).

By Robert B. Benson, M.A., F.R.E.S.

I have dealt elsewhere (Benson, 1953) with the discovery in Inverness-shire, Scotland, in May, 1952, of *Fenella monilicornis* Thomson, a species heretofore only recorded from Norway and Sweden. In making this determination I was much indebted to Dr. Lindroth of Lund who lent me the type material of the species. This enabled me at the same time to place *F. famosa* Benson (1950) from subalpine Switzerland as a synonym of the same species. Dr. Lindroth also sent me the type material of *F. minuta* Thomson, and through the kindness of Dr. M. Hering of Berlin in lending me the types of *F. voigti* Hering at the same time, I was able to establish the synonymy of these two species. And since the type of *Paraphyllotoma judaica* Forsius (1930) is in the British Museum, the opportunity was taken of writing a key to the known species with all the types at hand. At the same time I am describing one new species from a specimen kindly lent to me by Dr. Berland of the Paris Museum.

The genus *Fenella* (*cf.* redefinition by Benson 1952) is restricted so far as is known at present to Europe and the Mediterranean region. But it may very well have been overlooked in other parts of the northern hemisphere, because its species are among the smallest known sawflies, which, by their retiring habits, are not easy to collect except by searching for their leaf-mines and rearing from them. The tribe Fenusini of the Blennocampinae to which the genus belongs are all leaf-miners as larvae so far as is known. *Fenella* is most closely related to *Fenusa*, but, whereas the known species of *Fenusa* all mine in the leaves of trees, the known species of *Fenella* mine in herbaceous Rosaceae (*Potentilla* and *Agrimonia*) or *Geranium* and allied genera of Geraniaceae.

Fenella granulata sp. n.

Colour : ♀ black with the following parts brown : the labrum, and the tibiae and tarsi of all legs. Wings hyaline : stigma and venation brown. Length 3 mm. *Head* as in *F. nigrita* Westwood but the clypeus is slightly more emarginate in front, and, together with the supra-clypeal area, the inner and outer orbits in front, as well as the front part of the frons, is covered with fine scattered punctures. Hind ocelli further apart than each is from its nearest eye margin (POL : OOL as 1 : 0·8), or than the distance of one from the back of the head (1 : 0·7).

Antenna 13-segmented and about twice as long as the width of the head behind the eyes ; third segment about 4 times longer than broad, and longer than fourth segment (as 1 : 0·6) ; fourth and fifth segments almost equal in length, likewise are seventh to tenth, and 2–3 times as long as broad.

Thorax : Mesonotum with the middle of the lateral lobes covered with fine granular surface sculpture. Legs as in *nigrita*. Wings as in *F. minuta* Thomson ; in the forewing the vein 2 mcu is received on M closer to 2rm than the length of 2rm, and the basal sector of M is more strongly angled at the base and straight in its apical two-thirds (fig. 2).

Abdomen coriaceous above ; ovipositor about as long as a hind femur without the second trochanter ; sawsheath strongly compressed laterally and very broad in lateral view with rounded apex.

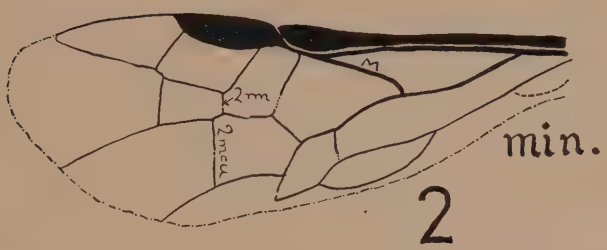
Pubescence scattered over whole insect but obsolete on the sculptured parts of the lateral lobes of the mesonotum.

Algeria : Phillippeville, 1 ♀, 1903 (*A. Thery*). (Muséum national d'Histoire naturelle, Paris.)

Key to Species of *Fenella* Westwood.

1. Forewing with vein 2 mcu received on M much further from 2 rm than the length of 2 rm (fig. 1). Head with the hind ocelli closer together or at most little further apart (1 : 0·8 to 1·1) than the distance of each from the eye margin of the nearest eye, and about the same distance apart as each is from the hind margin of the head. Side lobes of mesonotum without surface sculpture . . . . . 2.

–. Forewing with vein 2 mcu received on M not further from 2 rm than the length of 2 rm (fig. 2). Head with hind ocelli much further apart (1 : 0·6 to 0·8) than the distance of each from the nearest eye margin and much further apart than the distance of each from the



Figs. 1–2.—Left fore wing of : (1) *Fenella nigrita* ; and (2) *F. minuta* to show position of vein 2 mcu in relation to 2 rm and shape of basal sector of M.

hind margin of the head. Side lobes of mesonotum often more or less with coriaceous or granular surface sculpture. (Antenna 12–14 segmented) . . . . . 4.

2 (1). Antenna 11–12 segmented and in ♀ (♂ unknown) less than one and a half times length of the breadth of the head. Basal sector of M in forewing arcuate throughout though more strongly bent at base (fig. 1). (Antenna third to fourth segment as 1·6 : 1 and fourth about as long as second.) (Mines in *Potentilla reptans* L. and *grandiflora* L., also in *Agrimonia eupatoria* L. Throughout Europe.)

♀ **nigrita** Westwood

–. Antenna 13–16 segmented and at least twice as long as breadth of head. Basal sector of M in fore wing almost angled at base and then straight in apical two-thirds (*cf.* fig. 2) . . . . . 3.

3 (2). Antenna with length of third to fourth segment as 1·2 : 1. ♀. (♂ unknown) (? Mines in leaves of *Geranium sylvaticum* L. Northern and subalpine Europe (Norway, Sweden, Scotland and Switzerland)) (=*famosa* Benson **syn. nov.**) . . . . . ♀ **monilicornis** Thomson

–. Antenna with length of third to fourth segment as 1·6 : 1. ♂. (♀ unknown.) (Food-plant unknown. Palestine.) (*Paraphyllotoma judaica* Forsius, 1930) . . . . . ♂ **judaica** (Forsius)

4 (1). Antenna in ♀ about twice as long as breadth of head with ninth and tenth segments at least one and a half times as long as broad and one and a half times as long as breadth of second segment. (♂ unknown). (Food-plant unknown. Algeria.). ♀ **granulata** sp. n.

–. Antenna in ♀ only about one and a half times as long as breadth of head, with ninth and tenth segments scarcely one and a half times as long as broad and scarcely longer than breadth of second segment. ♂ with antennae twice as long as breadth of head and with segments 9 and 10 more than twice as long as broad. (Mines *Geranium columbinum* L., *pusillum* L., *pyrenaicum* Burm., etc. Germany, Sweden, Switzerland and Spain.) (= *voigti* Hering **syn. nov.**) ♂♀ **minuta** Thomson

References.

Benson, R. B., 1950, Two new Swiss Sawflies, a *Tenthredo* and a *Fenella* (Hymenoptera : Tenthredinidae). *Proc. R. ent. Soc. Lond.* (B) **19** : 55.

——, 1952, *Handbooks for the Identification of British Insects*, **6** (2*b*) : 109. R. ent. Soc. Lond.

——, 1953, Some Changes and Additions to the List of British Sawflies with the Description of Two New Species (Hym. Tenthredinidae). *Ent. mon. Mag.* **89**: 150–154.

Forsius, R., 1930, A New Genus of the Tribe Hoplocampini from Palestine. *Notul. ent., Helsingf.*, **10** : 103–4.

Hering, M., 1932, Minenstudien 13. *Z. PflKrankh.*, **42** : 572–4.

Thomson, C. G., 1871, *Hymenoptera Scandinaviae*, **1** : 181–2.

A NEW SPECIES OF *PHILONTHUS* STEPHENS FROM AFRICA (COL.: STAPHYLINIDAE).

By the Rev. C. E. Tottenham, M.A., F.R.E.S.

There are at least three species standing in collections under the name *Philonthus ocypoides* Schubert.

One of these is the species whose aedeagus I figured in 1949 (*Trans. R. ent. Soc. Lond.* **100**: 357, figs. 165, 166). The specimen was from the Belgian Congo and is in the Belgian Congo Museum. I possess a female, named by Bernhauer, which I believe to be the same species and which I am using for the comparative remarks below.

The second is a species in the British Museum (Natural History), from Salisbury, Mashonaland, also named "*ocypoides*" by Bernhauer, which is certainly distinct from the species above mentioned, and which does not agree with Schubert's description. This specimen I am here describing under the name *Philonthus irritans* sp. n.

The third, also in the British Museum and named "*ocypoides*," from Ibadan, Nigeria, a male, appears to be identical with the species which I have described (♀) under the name *Philonthus salti* sp. n. (1953, *Ann. Mag. nat. Hist.* (12) **6**: 506).

The aedeagus of this species I am also figuring in this paper.

Philonthus irritans sp. n.

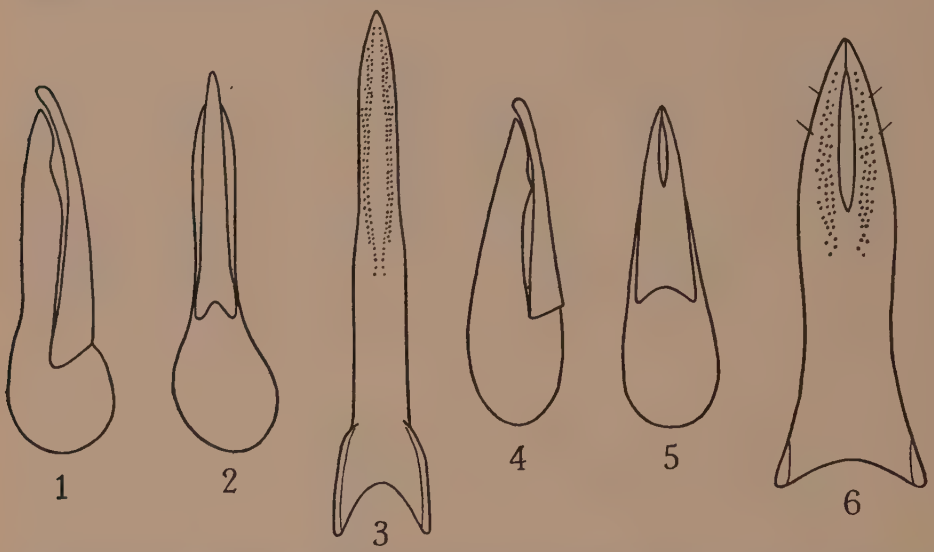
In general appearance and in the 4-punctate discal series of the pronotum very much like *P. ocypoides* Schubert.

Reddish-brown, with head black; the pronotum a little more reddish than the rest of the body, antennae somewhat more brownish towards the apex.

Head quadrate, transverse; front margin feebly curved, convex; eyes large, very little protruding from side of head, their longitudinal diameter fully twice as long as the temples behind eyes measured from hind margin of eye to bristle; interocular punctures slightly closer together than are the bases of the antennae, their distance apart being twice their distance from the anterior marginal puncture of the eye; three large punctures at the inner hind angle of each eye, of which the middle one is slightly distant from the ocular margin; level with the first of these punctures, on each side is another large puncture situated exterior to the inter-ocular puncture; this puncture is the first of three large punctures situated in an oblique line backwards to the neck, the basal one being on the posterior margin of the head and situated rather close to the corresponding puncture on the other side; outside this row are two others in line with the basal puncture and the middle one of the three at the hind angles of eye; numerous slightly smaller punctures in the post-ocular region; sides behind eyes parallel, almost straight; posterior angles obtusely rounded and then straight and oblique to neck; microsculpture extremely close and extremely fine, only visible under high magnification.

Antennae rather long, reaching beyond the base of the pronotum; segments 5–10 distinctly but not very strongly serrate; segments 2 and 3 about equal in length, nearly three times as long as broad; 4 about two-thirds the length of 3, slightly broader at apex; 5 slightly shorter than 4, and slightly longer than broad; 6–9 a little shorter, longer than broad; 10 slightly longer than broad; 11 distinctly longer than 10, rather slender and strongly emarginate apically.

Pronotum distinctly, but not strongly transverse, anterior margin as wide as head (across eyes), towards base a little wider; anterior margin somewhat convex; anterior angles obtusely rounded viewed from above, acute but rounded viewed obliquely; sides (viewed from above) feebly divergent and very feebly rounded; posterior angles obtusely rounded in a continuous curve with the distinctly rounded base; pronotum widest at the level of the hind puncture of the discal series; discal series each consisting of four moderately strong punctures, the first of which is a little distant from the anterior margin; the distances between the punctures being approximately in the ratio 1 : 2 : 2; a large puncture on the anterior margin, lateral to the first puncture of the discal series and as distant from it as the second puncture of the series; 2 other punctures in a line (slightly sloping backwards externally) with the first discal puncture; these three punctures are equidistant and the lateral one is some distance from the side margin; somewhat parallel



Figs. 1–3.—*Philonthus irritans* sp. n., 4–6.—*Philonthus salti* Tottenham. (1) and (4) lateral view of aedeagus, (2) and (5) upper view of aedeagus, (3) and (6) inner face of paramere (more highly magnified). (M. Haslop del.)

to these are two others in line (slightly curved, convex behind) with the second discal puncture, each a little more distant from the side than the punctures in front of them; another puncture behind these and midway between them; a few on the margin near the posterior angles; microsculpture as on the head.

Scutellum closely and finely punctured and pubescent.

Elytra as wide as pronotum, quadrate, very closely and finely punctured and pubescent, very similarly to the scutellum.

Abdomen similarly punctured on tergites 3, 4 and 8, much more densely and much more finely punctured and pubescent on tergites 5–7.

Legs with tibiae spinose and densely pubescent; posterior tarsi with segment 1 a little longer than 5 (without claws), not quite as long as 2–4 together, the segments 2–4 all distinctly longer than broad.

♂. Anterior tarsi dilated; tergite 8 with very small triangular notch in middle of hind margin; sternite 8 deeply triangularly emarginate in middle of hind margin, the emargination being rather narrow, extending about half the length of the sternite, and rounded at apex. Aedeagus with median lobe (upper view) long and narrow, sharply pointed at

apex (lateral view), with blunt hook at apex on inner side, behind which is a slight, gradually raised keel; viewed from the inner side this keel is seen to be two short ridges on each side of the middle having almost the appearance of two narrow tubercles; paramere viewed on its outer face very long, narrow and pointed, viewed laterally, distinctly curved, narrowed in apical half, slightly thickened at extreme apex, extending beyond the apex of the median lobe; on inner face, on each side of the middle, closely set with a double (for the most part) row of pegs; these two rows become single and converge towards the middle of the paramere.

Type (unique ♂) RHODESIA: Mashonaland, Salisbury, xii.1897 (*Marshall* coll.), *P. ocypoides* Schub., Bernhauer det. in British Museum (Natural History).

The differences between this species and its nearest allies, namely *ocypoides* Schubert and *salti* mihi, may be seen from the following emendation to my key to the large brown species of African *Philonthus* (*loc. cit.* : 361).

3. Discal series of pronotum consisting of 5 or more punctures . . . 4
   Discal series of pronotum consisting of 4 punctures 3*a*

3*a*. Size smaller, 12 mm.; pronotum scarcely transverse; temples (from hind margin of eye to bristle) very short, about one-quarter the length of the eye; ♂, aedeagus with paramere longer than median lobe, divided apically and with two triple rows of pegs . . . **salti** Tottenham
   Size larger, 14 mm.; pronotum distinctly transverse; temples one-third to one-half the length of the eye 3*b*

3*b*. Antennae distinctly serrate, longer, penultimate segments at least as long as wide; antennae with segments 2 and 3 long, nearly three times as long as broad; pronotal series of punctures moderately strong and evident; abdomen a little more finely and more densely pubescent; ♂, aedeagus with paramere longer than median lobe . . . . . **irritans** sp. n.
   Antennae scarcely serrate, penultimate segments transverse; segments 2 and 3 much shorter, about twice as long as broad; pronotal punctures much weaker; abdomen slightly more strongly and a little less densely punctured; ♂, aedeagus with paramere shorter than median lobe . . . . . **ocypoides** Schubert

A NEW SPECIES OF *LUCRETILIS* (ORTHOPTERA-ACRIDIDAE) FROM MALAYA.

By N. C. E. Miller, F.R.E.S., F.Z.S.

Lucretilis jucunda sp. n.

Colour: Antennae piceous; basal segments suffused with green; apical segment narrowly ferruginous at apex. Eyes black. Head dark green; frons, clypeus and labrum suffused with ochreous; inner margin of mandibles with a whitish spot; basal half of fastigium of vertex, apex of vertex, a suffused stripe in front of eyes and along genae,

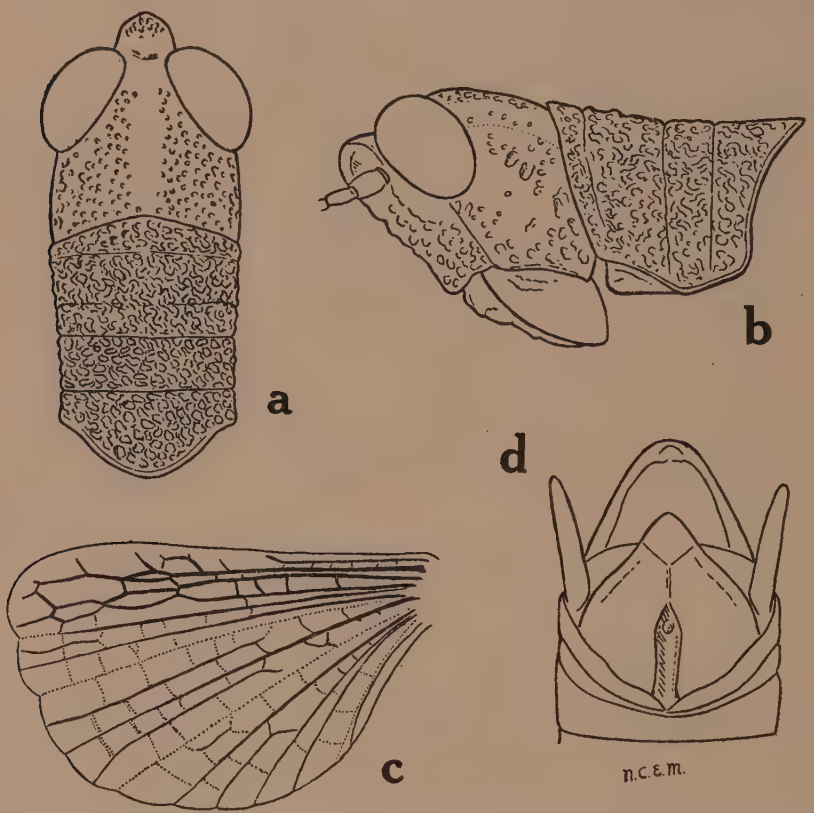


Fig. 1.—*Lucretilis jucunda* sp. n. *a*, Head and pronotum, dorsal view. *b*, ditto, lateral view. *c*, Wing. *d*, Apex of abdomen, dorsal view.

lateral stripes behind eyes dorsally whitish. Disc of pronotum olivaceous, whitish laterally; lateral lobes, pleura dark green with a transverse whitish stripe; sternites pale green. Abdomen green suffused with vinaceous in basal half; sub-dorsally with a whitish stripe; spiracular area suffused with white. Elytra faintly infumate; venation pinkish white. Wings faintly infumate with fine castaneous maculation; venation blackish and whitish. Anterior and median legs pale olivaceous; posterior femora dark ochreous, knee blackish;

area between genicular arches and lobes dark castaneous ; posterior tibiae violaceous with a whitish spot sub-basally on outer surface ; spines black ; posterior tarsi dark ochreous.

Structure : Antennae about twice as long as head and pronotum together ; segments in apical half somewhat compressed dorso-ventrally. Eyes oval. Interocular distance wider than frontal ridge between antennae. Frontal ridge from the front rugose, margins sub-parallel, irregular, obsolete from lower margins of eyes to clypeal suture ; lateral carinae ill-defined, sinuate ; face strongly rugose except for small glabrous areas in front of eyes ; lower half of genae rugose foveolate ; upper half with large punctate foveolae and small punctures ; vertex laterally foveolate punctate ; fastigium of vertex about as long as wide, foveolate in apical half. Pronotum selliform, rugose punctate ; disc with four transverse sulci, the third at the middle. Prosternal spine quadrate, transverse, feebly constricted basally, flattened and punctate apically. Inner margins of mesosternal lobes rounded, separated by a little less than half the width of a lobe ; inner margins of meta-sternal lobes contiguous. Elytra with moderately prominent costal lobe and extending just beyond posterior margin of fifth abdominal segment. Supra anal plate triangular, sub-acute apically, deeply medially sulcate in basal half and with apex deflected ; margins of sulcus elevated. Cerci simple. Sub-genital plate conical, rounded apically. Oblique ridges on posterior femora irregular ; carinae sub-serrate, the serrations widely separated. Posterior tibiae with eight spines, including an apical spine on external surface and nine spines on internal surface.

Total length, 23·00 mm. ; pronotum, 5·00 mm. ; elytra, 9·50 mm. ; posterior femora, 13·00 mm.

1 ♂ (type), Malaya : Selangor, Kuala Lumpur, 6.xi.1940 (*N. C. E. Miller*).

This new species is apparently allied to *Lucretilis uvarovi* Miller (1935, *J.F.M.S. Mus.* **17** : 695) from which it differs in coloration, sculpture and venation of elytra. It differs from all other known species in coloration. The type has been deposited in the British Museum (Natural History), London.

Book Notices.

Insect Physiology. Edited by Kenneth D. Roeder. Large 8vo. New York (John Wiley & Sons, Inc.) and London (Chapman and Hall), 1953. Pp. xiv + 1100, text illust. Price £6.

In his preface to this work the editor states that its object is to summarize and evaluate the major trends in experimental research on insects, an object made urgently desirable by the great increase in the literature in recent years.

The thirty-two chapters, each dealing with a separate field, are the work of specialists. In many cases it has only been possible to select for discussion a part of the large volume of published work, and the book is therefore a critical discussion rather than a complete review of insect physiology.

Insect physiology is not presented as a separate compartment of knowledge and it is recognised that overlapping between the chapters themselves has been inevitable.

The work also includes information "on the mode of action of enzyme inhibitors, drugs and other chemical agents, as such information provides a link between physiology and biochemistry on the one hand and physiology and applied entomology on the other."

A bibliography (with abbreviated titles of papers) of 110 pages and a detailed index complete the work.

Bibliography of Key Works for the Identification of the British Fauna and Flora. Edited by John Smart and George Taylor. 2nd edn. 8vo. London. (*The Systematics Association*, c/o British Museum (Natural History), 1953. Pp. 126. Price 12*s.* 6*d.*

The second edition of this work, necessitated by the exhaustion of the first edition, is based on the material of that edition. The entomological sections of this edition have been augmented by the inclusion of much recently published literature. The botanical section has been largely re-written.

It should be noted that the better known groups are dealt with in few references, and it may be taken as a general statement that the larger the number of references to a group the greater the need for study of that group.

A NEW TACHINID PARASITE OF AN EMBIOPTERON.

By L. P. Mesnil.

The present paper deals with a Tachinid which was reared from an Embiopteron at Grahamstown (South Africa) by Mr. G. B. Whitehead, on 9th December, 1949.

Dr. Edward S. Ross, of the California Academy of Sciences, having studied Mr. Whitehead's material, has been so good as to forward it to the writer, pointing out that the host Embiopteron (a female) is a *Dictyoploca* sp. n. (Plate I, fig. 2.)

It may be mentioned that up to the present no parasite attacking Embioptera has been recorded, hence the particular value of Mr. Whitehead's observation.

The Tachinid is a male, preserved in good condition. In size, facies, colour, and pattern, it is rather similar to our European *Campogaster exigua* Meigen. It belongs to a new genus and a new species described below.

Rossimyiops gen. n.

In chaetotaxy as well as wing venation, this genus belongs to the European group comprising *Campogaster* Rond., *Rondania* Rob-Desv., *Strongygaster* Macq. (syn. *Tamiclea* Macq.). It does not appear to be related to any South African Tachinid. It differs considerably from these 3 European genera in having strong setae along the hind margin of the abdominal tergite, small, round and translucent calyptrae, oral opening three times as long as wide and narrower than the peristome. A short prealar seta and a vestigial pteropleural are evident. Wing with vein r_{4+5} bare, second costal segment very short, R_5 closed at apex and apical cross-vein markedly concave.

Rossimyiops whiteheadi sp. n.

Head (Plate I, fig. 1) black with brown interfrontalia. Face, parafacials, peristome and parafrontalia with a slight cinereous pollinosity. Antennae blackish, second segment and upper part of third yellowish. Palpi pale testaceous. Thorax black, with very slight cinereous dust which is more visible on the sides and humeri. Dorsal portion of mesonotum showing, in front of the transverse suture, three undusted black vittae, which are very diffuse and scarcely conspicuous. Scutellum black. Abdomen shining black, 3rd and 4th segments each with a transverse band of light cinereous pruinosity along fore-margin. Wing slightly brownish-yellow, darker towards base and along fore margin. Veins fuscous. Epaulet and basicosta blackish. Alar calyptra hyaline, white on external half, thoracic calyptra translucent, rather infuscated, with a white fringe. Halteres dark. Legs black, pulvilli yellowish grey.

Head subglobular, 1·8 times wider than high. Facial profile half as long as frontal. Frons extremely narrow, only a trifle wider in front of ocelli than a palp, about one-third head width at lunula. Parafrontalia two-thirds width of interfrontalia at any level. 2 rather strong ocellar setae, 2 vestigial decussate internal verticals. 10–12 small frontal setae not quite reaching antennal basis. Occiput rather flat, entirely covered with black hairs; postocular hairs rather short. Face raised, projecting in profile. Vibrissae thin and short, inserted at level of mouth margin. Parafacials bare, as wide as third antennal segment. Antennae short, 3rd segment 1·5 times as long as 2nd. Arista bare, thickened

on its basal fifth, the first two segments reduced. Peristome wider than oral opening, entirely occupied by the occipital expansion, which is densely covered with fine black hairs. Peristomal setae hair-like, short, numerous. Mouth opening 3 times as long as wide, narrower than peristoma. Proboscis not quite as long as the shorter diameter of the eye, with small labella. Palpi short and very narrow. Eyes naked.

Prosternum, propleura, beret and infrasquamal declivity naked. Posterior thoracic spiracles very small. Halteres clavate, their head as wide as third antennal segment. Chaetotaxy: 1+0 acrostichals, 2+3 dorsocentrals, 2 intra-alars, 1 supra-alar plus a vestigial prealar. 2 humerals, 1 posthumeral, 1 presutural, 2 notopleurals, substigmatical and prestigmatical hair-like, 2 sternopleurals, the anterior one thin, pteropleural vestigial, 3 hypopleurals. Scutellum subtriangular, its upper part rather flat and covered with short erect black hairs; basal setae rather short, apicals strong and cruciate, lateral thinner; no preapicals.

Fig. 1.—Wing of *Rossimyiops whiteheadi* Mesnil.

Abdomen ovate, strongly convex, broadly truncate at apex. Second tergite scarcely excavated behind scutellum, 3rd and 4th each as long as 5th. Hair erect except on mediodorsal region, where it is decumbent. 2 strong median marginals on 2nd segment, 2 strong median marginals and a row of weaker marginals on 3rd, a complete row of strong marginals on 4th and 5th.

Wing (fig. 1) narrow and elongate: costal spine very short. Base of vein r_{4+5} on both surfaces without hair. 4th segment 3 times as long as second. Anterior cross-vein situated towards level of end of r1. First posterior cell (R_5) closed at tip of wing. Bend of *m* rounded, very close to hind margin. Apical cross-vein markedly concave. Posterior cross-vein moderately sigmoid, joining the median vein (*m*) much nearer to anterior cross-vein than to bend.

Legs rather short, tarsi longer than tibiae. Fore claws not quite as long as claw joint. Fore tibiae with one posterior seta. Mid tibiae bearing 2 antero-dorsal setae, 2–3 posterior and 1 internal. Posterior tibiae showing 3 short antero-dorsal setae and a few hairs, 3 postero-dorsals, 2 internals, 2 apical-dorsal setae, 2 apical internal spurs.

Length 4 mm.

Holotype, ♂, South Africa: Grahamstown, 9.xii.1949, ex *Dictyoploca* sp. (*G. B. Whitehead*).

1.—*Rossimyiops whiteheadi* Mesnil. Head in profile.

2.—Debris of *Dictyoploca* sp. n., showing the pupa of *Rossimyiops whiteheadi* inside.

THE GENUS *FORMICOMUS* (COLEOPTERA, ANTHICIDAE) IN H. C. DOLLMAN'S COLLECTION FROM N. RHODESIA.

By J. C. van Hille, Ph.D., F.R.E.S.

(*Department of Entomology, Rhodes University, Grahamstown, South Africa.*)

Introduction.

H. C. Dollman was stationed in the Western half of Northern Rhodesia as Entomologist to the Sleeping Sickness Survey of the British South Africa Company. The specimens dealt with in this paper were collected between 1913 and 1915 during his first stay in Africa. After a second period in Central Africa this gifted Entomologist died of sleeping sickness in London in January, 1919, at the age of 30.

The specimens form part of the collections of the British Museum (Natural History), to the authorities of which I am grateful for the opportunity of studying this material.

The genus *Formicomus* is represented in Dollman's collection by 60 specimens belonging to ten species. These may be divided conveniently into four groups as follows :—

Group 1 : Prothorax with a clear longitudinal groove (Group *F. canaliculatus* Laf.).

F. tropicalis Krek. ; 4 specimens.
F. lacustris Krek. ; 5 specimens.

Group 2 : Prothorax red, orange or dark yellow ; elytra glossy with metallic green or blue reflection.

F. rubricollis Laf. ; 17 specimens.
F. tuberculifer Pic. ; 6 specimens.

Group 3 : Prothorax black ; elytra glossy, with metallic green or blue reflection.

F. pagnioni Pic ; 4 specimens.
F. chappuisi Pic, colour variety ; 1 specimen.
F. spatulatus van Hille ; 2 specimens.
F. dollmani sp. n. ; 9 specimens.
F. livingstonei sp. n. ; 3 specimens.

Group 4 : Body dull black all over.

F. subinflatus Pic ; 9 specimens.

Group 1.

Formicomus tropicalis Krekich-Strassoldo, 1928.

Namwala, iii.1913 ; 2 specimens.
Mwengwa (27° 40′ E., 13° S.), 23.vii.1913 and 5.viii.1913 ; 2 specimens.

This species was described from a single male from Kafue. The type specimen is probably in the Natural History Museum in Vienna. It occurs in Central, East and South Africa between 8° and 30° S.

I have seen specimens from the following localities :

Belgian Congo : Upemba National Park, 1947–49 (*G. F. de Witte*).

Lake Nyasa : i.1950 (*J. Tully*).

Nyasaland : Blantyre, v.1948 (*E. T. M. Reid*).

S. Rhodesia : Wankie, 1st Drift, 23.i.1949 (*D. F. Lovemore*).

Mozambique : Umbeluzi, 14 miles from Lourenço Marques, i.1948 (*A. J. Barbosa*).

South Africa : Kimberley, along Vaal River, ii.1947 (*R. J. B. Power*). Barkley West, along Vaal River, vii.1949 (*R. J. B. Power*).

Formicomus lacustris Krekich-Strassoldo, 1928.

Kafue River, Namwala, iii.1913, 5 specimens.

This species was descrided from Lake Rudolf. It has a wide distribution.

I have seen specimens from the following localities :

Gold Coast : Labadi, 4.v.1941 (*K. M. Guichard*). (In British Museum.)

Southern Ethiopia. (In Mus. nat. Hist. nat., Paris.)

Lake Victoria : Karungu Island, xii.1949 (*E. Pinhey*).

N. Rhodesia : Mazabuka, i.1947 (*A. Lewin*).

South Africa : Mkuzi, Zululand, i.1948 (*J. Omer-Cooper*).

Group 2.

Formicomus rubricollis de la Ferté Sénectère, 1848.

Mwengwa (27° 40′ E., 13° S.), 28.vii.1913 ; 7 specimens.
Mumbwa, xi–xii.1913 ; 9 specimens.
Namwala, 28.iii.1913 ; 1 specimen.

Formicomus tuberculifer Pic, 1897.

Mwengwa, 15.v.1913 ; 2 specimens.
Namwala, iii.1913 ; 1 specimen. iii.1914 ; 3 specimens.

I have recently dealt with these two species (van Hille, 1953). They have a rather similar distribution over the Eastern half of Africa round and South of the equator, though *F. tuberculifer* has also been collected in S. Angola, vii.1948 (*C. Koch*). The most south-western records for these species are George for *F. rubricollis* and Grahamstown for *F. tuberculifer*. In addition to the localities given in my previous paper, both these species occur in the Upemba National Park, Belgian Congo, where they have been collected by the expedition of G. F. de Witte 1947–1949.

Group 3.

This group contains the greater number of all the East-, Central- and West-African species. The species are extremely alike in appearance but identification is possible from the secondary sex characteristics of the male, which in the genus *Formicomus* show a remarkable variety of shapes. The

last visible abdominal sternite and the retractile segment are systematically the most useful.

Formicomus pagnioni Pic.

Kashitu, North of Broken Hill, 26.iv.1915. 4 specimens.

The most striking external feature of this species is the transverse band of coarse white hairs on the anterior half of the elytra, a feature which it shares with a number of very similar species. The species was described from Timbuctu (Pic, 1898). Specimens were studied from the following localities :

Middle Niger : 1900 (*A. Chevaliers*).

French Guinea : Seriba, 28.viii.1944 (*K. M. Guichard*).

The specimens from Northern Rhodesia differ from these West African species mainly by a stronger chitinisation.

Formicomus chappuisi Pic, colour variety.

Mwengwa (27° 40′ E., 13° S.), 25.ix.1914. 1 ♂.

The colour of this single specimen is quite different from that of the S. Abyssinian type specimens (Pic, 1939). These are dark brown, with the anterior part of the elytra black or almost black. The specimen in Dollman's collection is black with a faint blue reflection on the elytra.

A case of colour regression in *F. tuberculifer* has been discussed at some length in a previous paper (van Hille, 1953). With much more material at my disposal I could show the regression from a black head and body, red prothorax and metallic blue elytra to a general testaceous appearance. This example makes the regression in colour in the present case less improbable.

The morphological similarity, especially the male characteristics, are therefore taken to carry more weight than the colour difference. It is found in *Formicomus* that with great uniformity in body shape the male genitalia are strikingly different from one species to the other. In the present case the last visible sternite (fig. 1c) with the slender but prominent median process with terminal hair tuft together with the retractile sternite (fig. 1d) with a single pair of pointed prongs and lateral hair tufts are characteristic. The aedeagus (fig. 1f) with the tegmen ending in three subequal points, the pointed hairy halves of the retractile tergite (fig. 1e) and the well developed, pointed spine on the front femur and the tubercle on lower half of front tibia (fig. 1g) are less typical, but do agree well in the specimens of different colour from the two different localities. The only morphological difference seems to be in the shape of the head, which in the type specimens is rounder (fig. 1a) than in Dollman's specimen (fig. 1b). This is an unsatisfactory point, but without more evidence and material it is not considered to be sufficient for a systematic separation.

Specimens were investigated from :

Omo River: Bourié or Bourillé, 600 m., 1932–1933. (Cotypes) (*C. Arambourg, P. A. Chappuis and R. Jeannel*).

Kenya : Kisumu, iii.1936 (*J. A. Turner*). These agree with the type specimens in head shape and colour.

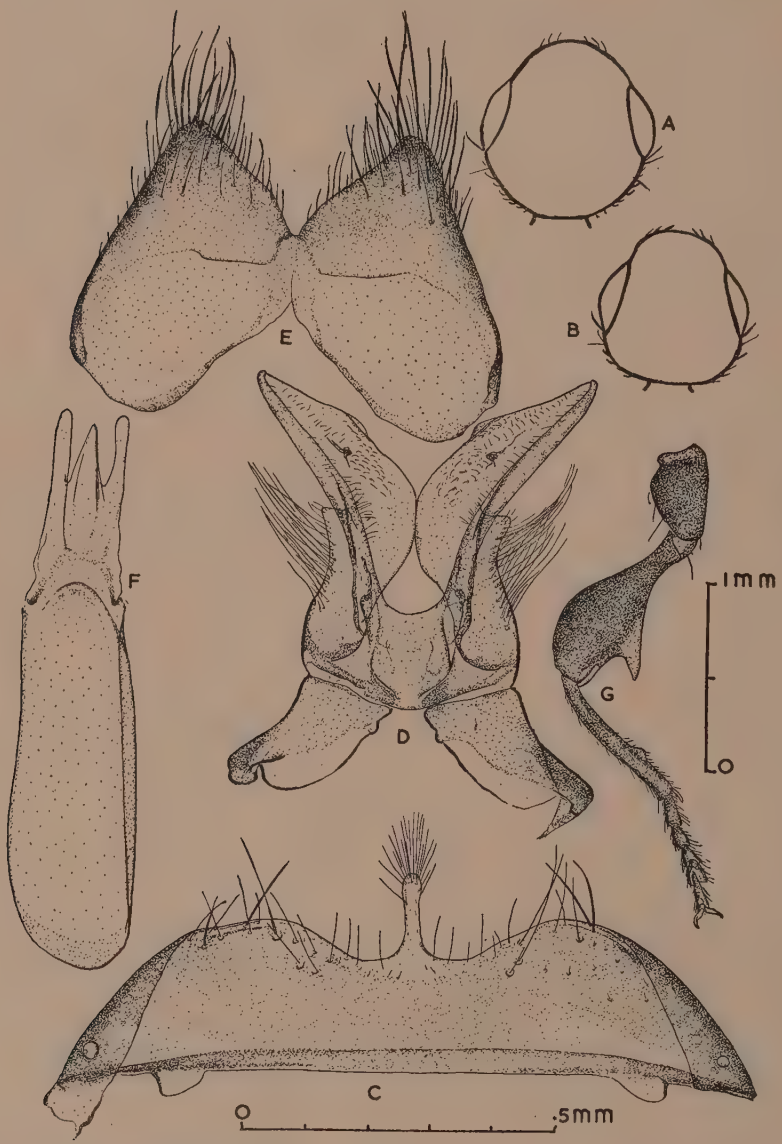


FIG. 1.—*Formicomus chappuisi* Pic. (A) head of cotype; (B–G) parts of the ♂ specimen in Dollman's collection; (B) head; (C) last visible sternite; (D) retractile sternite; (E) retractile tergite; (F) tegmen of aedeagus; (G) front leg. (A, B and G at smaller scale; C, D, E and F at larger scale.)

Formicomus spatulatus van Hille.

Mwengwa 3.iii.1914. 2 specimens.

These specimens are smaller (L. 3 and 3·1 mm.) than the type (L. 3·7 mm.), which was described (van Hille, 1950) from a single misnamed specimen from Nairobi, collected in November, 1911, by Alluaud and Jeannel. Since the description was published Mr. Elliot Pinhey of the Coryndon Memorial Museum, Nairobi, sent me more specimens of this species collected at Athi River by van Someren in February, 1940.

The specimens collected by Dollman differ from those of Kenya (apart from the smaller size) in being more strongly chitinised and having a very fine median longitudinal groove on the prothorax, suggesting the *F. canaliculatus* group. In none of the Kenya specimens is this groove clear, though there is an indication of it in some of the specimens, which was previously overlooked.

In the Museum National d'Histoire Naturelle, Paris, I found some specimens with the unpublished name *F. inermis* Krek., named by Krekich-Strassoldo himself. These specimens belong to the same series as the type specimen of *F. spatulatus* van Hille, so they are paratypes. I found specimens labelled: type and paratypes of Krekich-Strassoldo's unpublished *F. inermis* in the Congo Museum, Tervuren, Belgium; specimens named paratypes of *F. inermis* Krek. are also present in the British Museum (Natural History), London. These were collected in Ruanda Bugarama in October, 1925, and Urundi Kanna in January, 1926, by Dr. H. Schouteden. These specimens from the West of Lake Victoria agree with Dollman's Rhodesian specimens in the smaller size (3·1 mm.) and the clearer longitudinal groove on the prothorax. Considering the similarity of the last visible sternite, the retractile sternite and the front leg of the male, I agree with Krekich that they should be considered as one species.

Formicomus dollmani sp. n.

Head oval, rounded at the back, very finely punctuated and chagrinated; with short white or grey hairs. *Prothorax*, rounded in front, constricted at posterior quarter, glossy black, a little less closely punctuated and more hairy than the head. *Elytra*, shoulders sloping and hardly angular, greatest width at the middle or just behind it. Glossy black with a slight blue reflection, fine punctuation definitely wider spaced than on prothorax, with white hairs, longer than on prothorax, not arranged in a posthumeral band; the hairs in these specimens are more numerous on the sides and the apices of the elytra than on the median front area, but it may be that they have been rubbed off in this more exposed area. *Antennae* slender, testaceous or dark testaceous, the distal 5, 6 and 7 segments, darker and gradually somewhat thickening towards the apex. *Legs* with femora rather swollen and black, tibiae and tarsi dark testaceous.

Male Characteristics:

Anterior femur with well developed spine (fig. 2D) and anterior tibia with small tubercle just beyond the middle. Last visible sternite (fig. 2A) with median point, provided with some stiff, sideways pointing hairs and on each side an inconspicuously projecting lobe. Retractile sternite (fig. 2B) with U-shaped median sclerite and simple prongs, without conspicuous tufts of hairs. Retractile tergite bilobed, not very hairy. Spiculum gastrale (fig. 2E) with a very well developed shaft, broader than in species of similar size and appearance.

Length, 3·10–3·43 mm.,; average 3·33 mm. Width (middle of elytra) 1·02–1·17 mm.; average 1·12 mm.

Types, Holotype ♂, N. Rhodesia: Namwala, 7.iv.1913 (*H. C. Dollman*) in British Museum (Nat. Hist.); last visible abdominal segment, retractile abdominal segment, aedeagus, spiculum and first leg on slides. Paratypes,

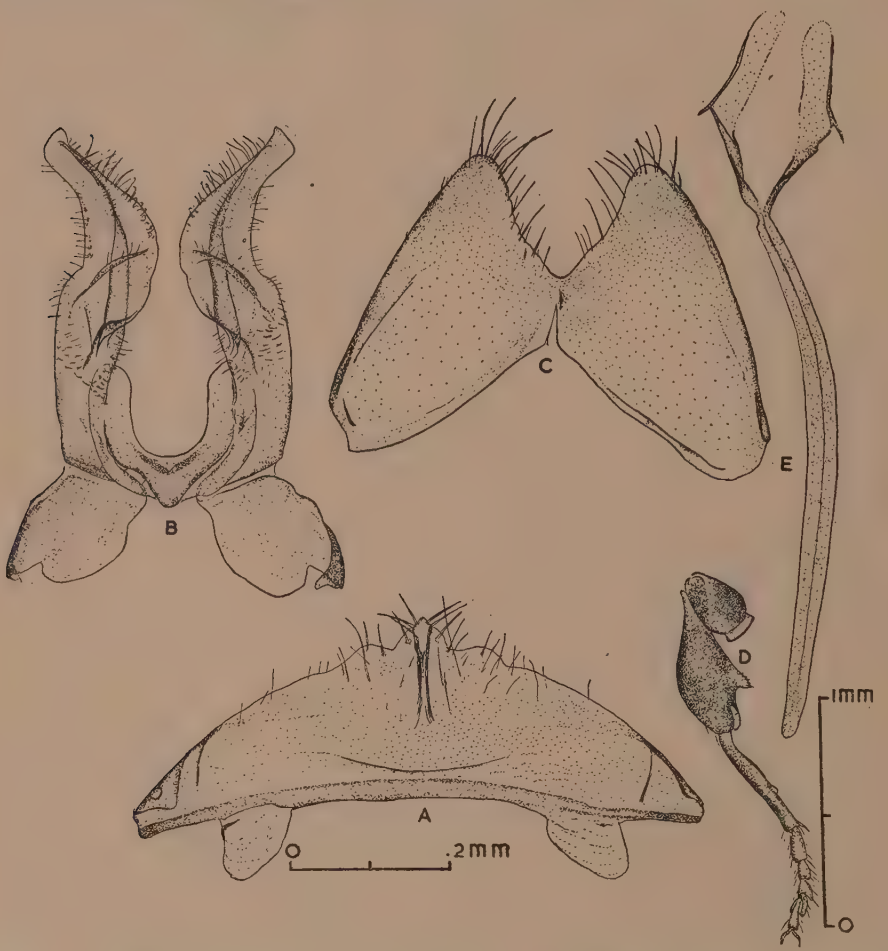


Fig. 2.—*Formicomus dollmani* sp. n. All parts of ♂. (A) last visible sternite; (B) retractile sternite; (C) retractile tergite; (D) front leg; (E) spiculum gastrale. (D at smaller scale; A, B, C and E at larger scale.)

N. Rhodesia: Chinenga, 4.vii.1913, 1 ♂, 4 ♀ and 5.vii.1913, 3 ♀ (*H. C. Dollman*) all in British Museum (Nat. Hist.).

A number of specimens of this species have been collected in the National Park Upemba, by the expedition G. F. de Witte, 15–19.i.1948. These are darker than the type specimens, the elytra appear black, the blue reflection is hardly or not at all visible. Antennae and legs are darker, almost black.

Size is larger. Length, 3·55–3·85 mm. Average, 3·72 mm. Width, 1·15–1·21 mm. Average, 1·18 mm.

Formicomus livingstonei sp. n.

Externally very similar to *F. dollmani* but smaller.

Head rounded at the back, black glossy, finely punctuated with fine soft grey hairs. *Prothorax* rounded in front, constricted at posterior quarter, black or very dark brown, glossy; punctuations slightly bigger than on head but about as closely placed; hairs

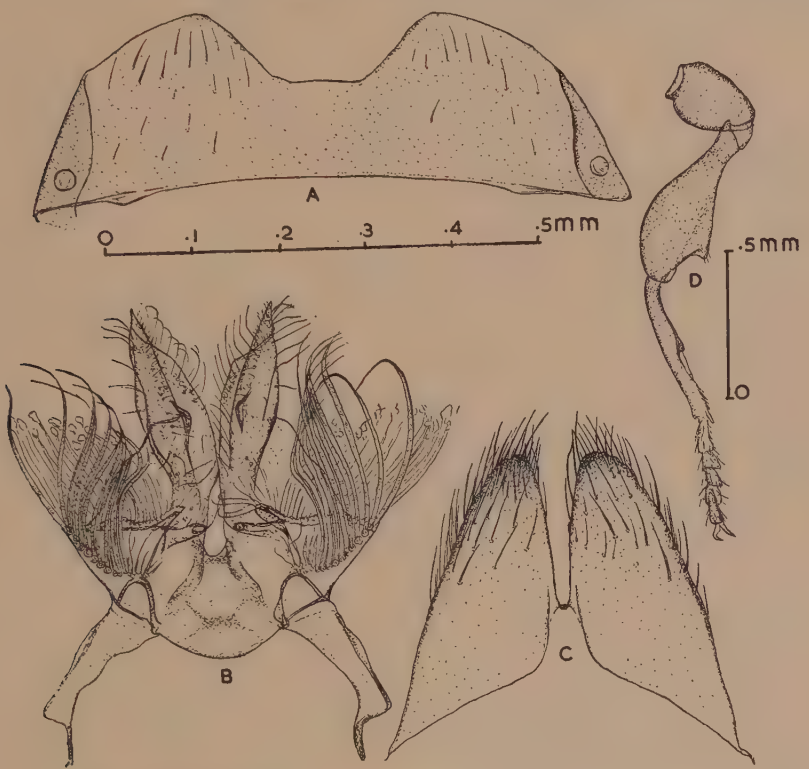


Fig. 3.—*Formicomus livingstonei* sp. n. All parts of ♂. (A) last visible sternite; (B) retractile sternite; (C) retractile tergite; (D) front leg. (D at smaller scale; A, B and C at larger scale.)

longer and coarser than on head. *Elytra*, shoulders sloping but angular, greatest width just behind the middle, black with blue reflection, fine punctuations, wider spaced than on head and prothorax; hairs very fine, greyish white. Antennae slender, testaceous at the base, thickening and darkening over the distal half. Legs slender, black, the tarsi sometimes a little less black.

Male Characteristics:

Anterior femur with well developed but short spine (fig. 3D); anterior tibia with short tubercle on anterior half. Last visible sternite (fig. 3A) with posterior margin medianly broadly cut in, without the usual median process. Retractile sternite (fig. 3B) with a

pair of pointed prongs and conspicuous side lobes on which a semicircle of thin, but broad hairs, which are pointed on the ventral side but on the dorsal side end in soft irregular lobes. Retractile tergite (fig. 3c) bilobed and slender.

Length, 2·73 mm. Width over elytra, 0·92 mm.

Types, Holotype ♂, N. Rhodesia: Livingstone, xi.1913 (*H. C. Dollman*) in British Museum (Nat. Hist.); last visible abdominal segment, retractile abdominal segment and first leg on slides. Paratypes, N. Rhodesia: Livingstone, ii.1913, 1 ♀ (*H. C. Dollman*) and Chinenga 5.vii.1913, 1 ♀ (*H. C. Dollman*) in British Museum (Nat. Hist.).

Group 4.

Formicomus subinflatus Pic.

Chinenga, 5.vii.1913; 1 specimen.

Mwengwa 27° 40′ E., 13° S. 15.xi.1913; 6 specimens. 19.iii.1914; 2 specimens.

This species was described from Salisbury (Pic, 1901). Among the African species this is striking by its generally dull black appearance. The post-humeral transversal row of hairs on the elytra is rubbed off in many specimens. In some specimens there is a glimpse of a blue reflection on the elytra but as a rule this does not show.

I have seen specimens from the following localities:

Belgian Congo: Upemba National Park, 1947–49 (*G. F. de Witte*).

Southern Rhodesia: Wankie, i.1947 (*D. F. Lovemore*).

Nyasaland: Lake Nyasa, vi.1948 (*E. T. M. Reid*).

References.

Krekich-Strassoldo, G. B., 1928, Il *Formicomus canaliculatus* Laf. e species affini d'Africa. *Ann. Mus. Stor. nat. Genova* **52**: 1–4.

La Ferté-Senéctère, M. F., de, 1848, *Monographie des* Anthicus, i–xxii, 1–340, plates 17–32. Paris.

Pic, M., 1897, Anthicides exotiques nouveaux. *Naturaliste* **19**: 340.

——, 1898, Coléoptères nouveaux de Tombouctou. *Rev. sci. Bourb.* **11**: 164–165.

——, 1901, Hylophilidae et Anthicidae de la Rhodesie. *Rev. Ent. Caen* **20**: 97–100.

——, 1939, Mission scientifique de l'Omo. Coleoptera XVIII. Rhyssopaussidae, Pedilidae, Hylophilidae, Anthicidae, Scraptiidae, Mordellidae, Oedemeridae, Alleculidae. *Mem. Mus. nat. Hist. nat., Paris* (n.s.) **9**: 153–170.

van Hille, J. C., 1950, Note on *Formicomus caeruleus* Thunb. with description of two new African species. *J. ent. Soc. S. Afr.* **13**: 68–72.

——, 1953, Note on *Formicomus rufescens* Per. (Coleoptera, Anthicidae), and a revision of the species of *Formicomus* with red prothorax in South Africa. *Proc. R. ent. Soc. Lond.* (b) **22**: 9–14.

THE TENEBRIONIDAE OF SOUTHERN AFRICA. XI: NEW EPITRAGINI AND CRYPTOCHILINI FROM THE BRITISH MUSEUM.

By C. Koch, F.R.E.S.

(*Entomological Department, Transvaal Museum.*)

In the present paper a few very striking new African Tenebrionids in the collection of the British Museum (Natural History) are described. I should like to express my gratitude to the Entomological Department of the Museum for having entrusted me with the study of their African Tenebrionidae, as well as to the South African Council for Scientific and Industrial Research, which enabled me to carry out my monographic studies on the South African Tenebrionidae.

My thanks are also due to Dr. Maria Corinta Ferreira, Lourenço Marques, who has kindly allowed me to publish some of the splendid drawings from the *Morphology of South African Coleoptera* on which she is working.

Himatismus (Curimosphena) rileyi sp. n.

Body oblong-oval, convex, dull, blackish to reddish-brown, appendages partly paler, pilose. *Head* above much narrower than pronotum, slightly convex, covered with moderately dense and coarse punctures tending to become transversely confluent with the intervals between punctures forming fine, transverse ridges on middle of vertex. Central lobe of epistome shortly produced, obtuse, distinctly separated from lateral portions of epistome by the parallel clypeal sutures. Eyes almost flat, hardly projecting beyond genal outlines, with their straight contours in line with the minute temples; dorsal portion twice as long as broad and distinctly longer than the adocular part of genae. Apical joint of maxillary palpi in both sexes of similar size, subcylindrical, slightly dilated towards the truncate apical margin; the latter considerably shorter than the lateral inner margin. Antennae stout and short, extending to about middle of pronotum or a little longer, increasing in width only apically; basal segment incrassate, knob-like, hardly shorter than the third segment; the latter a trifle longer than the second segment, about one-third longer than broad; fourth segment only very little longer than the third; the following segments becoming gradually shorter towards apex; eighth about square; ninth slightly transverse; tenth strongly transverse, almost twice as broad as long; apical segment small, glandiform, transverse, much shorter and much narrower than the penultimate. *Pronotum* convex, moderately transverse, broadest before middle, there about one and a half times as broad as long, a little narrower than elytra, with the sides rounded and narrowed towards anterior margin, straightly narrowed towards base. Anterior margin very shallowly emarginate, obsoletely carinate laterally, with rectangular and not produced lateral angles. Base very slightly bisinuate, obsoletely carinate along median portion, with sharp, rectangular posterior angles. Marginal edge of sides complete and sharply carinate. Integument covered with coarse, round, dense and well-separated punctures on disc, becoming longitudinally confluent and rugose on lateral portions. Middle of prosternum in the male smooth and shining, with a very fine, punctiform and setiferous fovea at centre. Prosternal process bent downwards. *Elytra* dull, oblong-oval, without shoulders, with

slightly and evenly rounded sides, which become gradually narrowed towards base; the latter emarginate, not broader than pronotal base; apical declivity flattened, with attenuate apex; humeral callus absent. Integument with well-defined, rather finely punctured primary rows; the intervals with very sparse sculpture and scattered yellowish pilosity; the odd intervals with continuous rows of short hairs, the even ones with the hairs confined to small patches, which are widely separated from one another by smooth and bare patches. Mesosternum densely covered with coarse and slightly elongate punctures. Metasternum a little shorter than basal sternite, between meso- and metacoxal cavities only two-thirds longer than metacoxal cavities. Disc of abdomen with fine and scattered setiferous punctures, becoming very fine on the two apical sternites. Anal sternite simple in both sexes, without impression. *Legs* short; the trochanters of anterior femora in both sexes simple, without spine; tibiae straight, with the underside of anterior tibiae and intermediate ones in the male sulcate on proximal half; basal segment of posterior tarsi considerably shorter than distal segment. Length 8 to 10 mm., width 3 to 3½ mm.

British East Africa, Uganda: Lake Rudolf, mouth of Kabua River, iii–iv.1931; 5 species (*E. B. Worthington*). Holo- and allotypes British Museum (Natural History), paratypes British Museum and Transvaal Museum nos. 427 and 428. Kenya: Turkana Prov., Lodwar, 14.iv.1934; 7 paratypes British Museum and Transvaal Museum nos. 429 and 430 (*L. Rudolf, Rift Valley Exped.*).

I have much pleasure in naming this new species in honour of Mr. N. D. Riley.

Systematic Position.—This new species belongs to the *semialatus*-group, which is characterised by the reduced wings, short metasternum and elytra without shoulders. Phylogenetically it seems to come near to *H.* (*C.*) *gedyei* Koch, 1950*a*, which is a member of the fully winged *villosus*-group; it differs considerably from this species in all the above mentioned characters of the *semialatus*-group, as well as in the more reduced sculpture on elytra, the abbreviate basal segment of posterior tarsi, and in the large and laterally more rounded pronotum, which is hardly narrower than the elytral base.

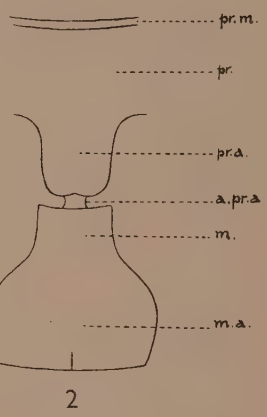
The two hitherto known species of the *semialatus*-group are readily distinguished from the new species as follows:

1. *semialatus* Koch, 1950*b*, by the strongly produced central portion of epistome; the short adocular portion of genae, which is considerably shorter than the dorsal part of eyes; the well-developed and convex temples; the longer antennae, which reach the base of pronotum; the much larger apical segment of maxillary palpi in the male; the produced lateral angles of the cordiform and larger pronotum; the laterally more rounded and shorter elytra, which are densely and almost irregularly punctured on disc; the tessellate patches on the third and penultimate intervals of elytra, which are formed by dense and short hairs, emerging from patches of densely conglomerated, subrugose and fine punctures; the densely punctured discal portion of metasternum and abdomen; and finally by the much longer legs.

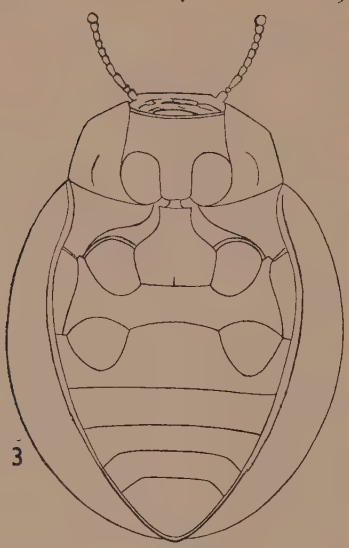
2. *ovipennis* Koch, 1950*a*, by the slender shape of body; the extremely dense and long pilosity on elytra, concealing a great part of the densely punctured background of the cuticle; the absence of the prosternal fovea in the male; and by the elongate claw segment of posterior tarsi, being almost as long as the two proximal segments combined.

Cryptochile multicostata sp. n. (Figs. 1–8).

Body globular, strongly convex, the entire cuticle concealed by a dense layer of whitish and brownish scales, forming numerous and irregular patches on elytra. *Head* small, almost perpendicularly hypognathous, with the underside embraced by the prothorax. Epistome depressed, separated from frontal surface by a transverse impression; apical margin shallowly emarginate; lateral margin rounded and projecting beyond genal contours. Genae strongly converging forwards, sharply separated from lateral contours of epistome. Vertex covered with round, moderately dense granules, from which emerge short, blunt, yellowish and adherent bristles; epistome with very scattered granules, broadly smoothed along apical margin. Antennae in the female almost reaching the pronotal base, with the two apical segments becoming gradually enlarged; eighth segment longer than broad; penultimate segment a trifle longer than the preceding segment but much broader, triangular and a little broader than long; apical segment oval, a little longer than broad and longer than the penultimate. *Pronotum* strongly transverse, convex, broadest behind middle, there a little more than twice as broad as long, almost three times as broad as head. Anterior margin narrow, evenly emarginate, with rectangular lateral angles. Sides rounded at middle, strongly and almost straightly convergent towards anterior angles, subparallel from about middle to posterior angles; marginal edge entire, dissolved into round granules at posterior one-half. Base two and a half times as broad as anterior margin, with a smooth marginal carina and bisinuate in median half with the lateral quarter rounded and distinctly produced backwards each side of the margined median part, bevelled in front of the slightly obtuse, posterior angles. Disc convex, with a transverse impression along anterior margin and base, longitudinally subsulcate along middle line. Integument densely covered with comparatively large, abraded, shiny and round granules which become distinctly elongate towards base; intervals between granules slightly smaller than diameter of granules; each granule with a short, yellowish, scale-like, adherent bristle, being inserted at the posterior margin of granule. Prosternum with short, collar-like and produced anterior margin, covered with a few scattered, fine granules; intercoxal process bent downwards behind coxal cavities, about one-third narrower than the transverse diameter of the latter; episternum densely covered with longitudinal granules on posterior half and inner portion. *Elytra* strongly convex, subglobular; the contours of convexity, in lateral aspect, sloping towards base and perpendicularly declivous apically. Base closely united to pronotal base and exactly following the course of the latter, with produced humeral portions, but not enclosing the posterior angles of pronotum. Sides strongly and evenly rounded, strongly narrowed towards the base which is without shoulders, including the greatest width of elytra at middle; there the elytra almost twice as broad as pronotum and one and a half times as broad as basally. Apical declivity high and perpendicular, without distinctly caudate apex. Each elytron with four to five primary rows, situated on the three inner fifths of elytron, and composed of strongly elevated, shiny, longitudinal tubercles, which are almost confluent and form narrow costae; there are three further but rudimentary rows of widely separated and elongate tubercles on the outer two fifths of elytron; the sutural row, which is bent outwards in scutellar region reaches the base; all the other primary rows, except for the fifth, are abbreviated before the base; sutural interval smooth, except for a few fine and irregular granules in scutellar region; the eight dorsal intervals of each elytron with a longitudinal median row of fine, round to more or less elongate, secondary granules, which are well separated from one another and become a little denser and coarser on lateral intervals. Marginal edge obtuse, situated at a much lower level than disc of elytra, composed of three poorly defined rows, formed by widely separated, abraded and shiny tubercles, of which those of the inner and outer rows are larger and denser than those of the median row. The entire surface covered with a dense layer of roundish scales, which are of a yellowish-grey to whitish ground-colour, densely spotted with dark brown patches discally; only the bare and shiny primary and secondary sculpture left exposed; the background of the intervals is uneven



2



3

4

FIGS. 1–4.—*Cryptochile multicostata* sp. n. (1) Dorsal view. (2) Pro- and mesosternum (schematic): *pr.*, prosternum; *pr.m.*, collar-like anterior margin of prosternum; *pr.a.*, prosternal apophysis; *a.pr.a.*, apex of prosternal apophysis, situated on epimeron of prosternum and above the basal foramen of prothorax; *m.*, discal part of mesosternum; *m.a.*, mesosternal apophysis. (3) Ventral view (schematic). (4) Lateral view (schematic).

on apical declivity and appears as if coarsely and densely punctured underneath scales; primary and secondary granules bearing very short, scattered and erect bristles. Pseudopleurae uniformly covered with moderate and scattered granules, the intervals between granules much wider than the diameter of granules. Underside of abdomen densely covered with yellowish-grey scales and numerous, round, fine, shiny and setiferous granules. The raised discal portion of mesosternum narrow, not broader than prosternal process, sharply separated from intercoxal process by a broad sinuosity; apical margin of intercoxal process about three times as broad as the raised discal portion of mesosternum, three-quarters broader than the transverse diameter of mesocoxal cavities. Metasternum between meso- and metacoxal cavities distinctly shorter than metacoxal cavities. Episternal parts of meso- and metasternum simple, with numerous, scattered, abraded and shiny, comparatively fine granules. Intercoxal process of basal sternite of abdomen distinctly broader than mesosternal process. *Legs* short and stout. Femora with scattered, uniform, fine, round and setiferous granules. Anterior tibiae with strongly projecting and large outer tooth at the apex, and with a few obsolete, more or less spiny tubercles on outer edge; the granules of intermediate and posterior tibiae becoming more distinctly strobiliform on apical one-third; tibial calcaria short, those of posterior legs broad and foliaceous, but blunt, with the longer of the two spurs being shorter than the basal segment of posterior tarsi. Tarsi shorter than tibiae; the basal segment of anterior tarsi about as long as the distal segment, that of intermediate tarsi a trifle shorter than distal segment, and that of posterior tarsi elongate and distinctly longer than distal segment. Length 13 mm., width 9½ mm., height 8¼ mm.

Locality.—Holotype ♀, Tanganyika Territory: Lindi district, Tendaguru, 11.vii.1924 (*W. E. Cutler*) (British Museum).

Systematic Position.—This new species stands in an isolated position within the genus *Cryptochile*, being readily distinguished by the shortness of the collar-like lobe of the anterior margin of prosternum; the peculiar shape of pronotum; the exceedingly convex elytra, which show, apart from the sutural row, four to five almost costate primary rows of granules on each, instead of the two costae usual in the other *Cryptochile*. From all the horatomoid Cryptochilini (cf. Koch, 1952), however, the new species differs greatly by the collar-like prolongation of the anterior margin of prosternum, and by having the five primary rows of elytra confined to the inner three-fifths of elytron, whereas the five primary rows occupy the entire dorsal surface of elytra in the horatomoid Cryptochilini.

The new species belongs to the East African branch of *Cryptochile*, which up to the present was represented by a single species group. The type form of this species group is *Cr. elegans* Gerstaecker, 1854, described from Inhambane in Portuguese East Africa. *Cr. sordida* Gerstaecker, 1854, coming from Moçambique, is not a *species propria* but is the female[1] *elegans* and has therefore to be synonymised with the latter. *Cr. patrizii* Gridelli, 1940, described from Italian Somaliland (Costa Bagiuni, Oltregiuba), is a geographical form of *elegans* and must be placed as a subspecies of the latter. It differs from typical *elegans* in the less convex elytra, the finer sculpture of body, especially the

[1] Gridelli, 1940, suggests that the tubercle on the underside of the anterior femora of his *patrizii* probably represents a sexual character of the male. Lacordaire and Haag have already mentioned this secondary sexual character of the males of Cryptochilini, consisting of a tuberculiform or callus-like dilatation of the proximal part of the inner carina of the underside of the anterior femur. It is found in the majority of Cryptochilini, and only *Pachynotelus*, *Horatoma* and single species of the other genera lack this distinctive character in the male.

dorsal costae of elytra and pronotal granules, and the longer and denser bristles on upper surface. *Cr. elegans* subsp. *patrizii* is known to me from the northern coast of British East Africa: Malindi, vii.1940, 3 ♀ (*G. W. Jeffery*) (Coryndon Museum); and Watamu, Mombasa, xi.1939, 1 ♂ (*G. W. Jeffery*) (Coryndon Museum).

Cr. elegans (with its northern subsp. *patrizii*) differs from the new *Cr. multicostata* as follows:

Pronotum flattened, moderately transverse, with finer and sparser sculpture; sides strongly and straightly convergent from base to anterior margin; base almost straight; median sulcus large and smooth. Collar-like lobe of anterior margin of prosternum long; granulation on prosternal epistern much more scattered. Elytra oval and not globular, moderately convex, often flattened discally, each elytron with only two primary costae, which are both situated on the inner half of elytron; each side of scutellum with an oblique, short and rudimentary row of granules, which does not represent the continuation of the sutural row. The raised discal portion of mesosternum distinctly broader than prosternal process, with straight and gradually dilated (and not subparallel) lateral margin, meeting the lateral margin of intercoxal process in a wide, obtuse angle; apical margin of intercoxal process one and two-thirds as broad as the discal portion of mesosternum basally.

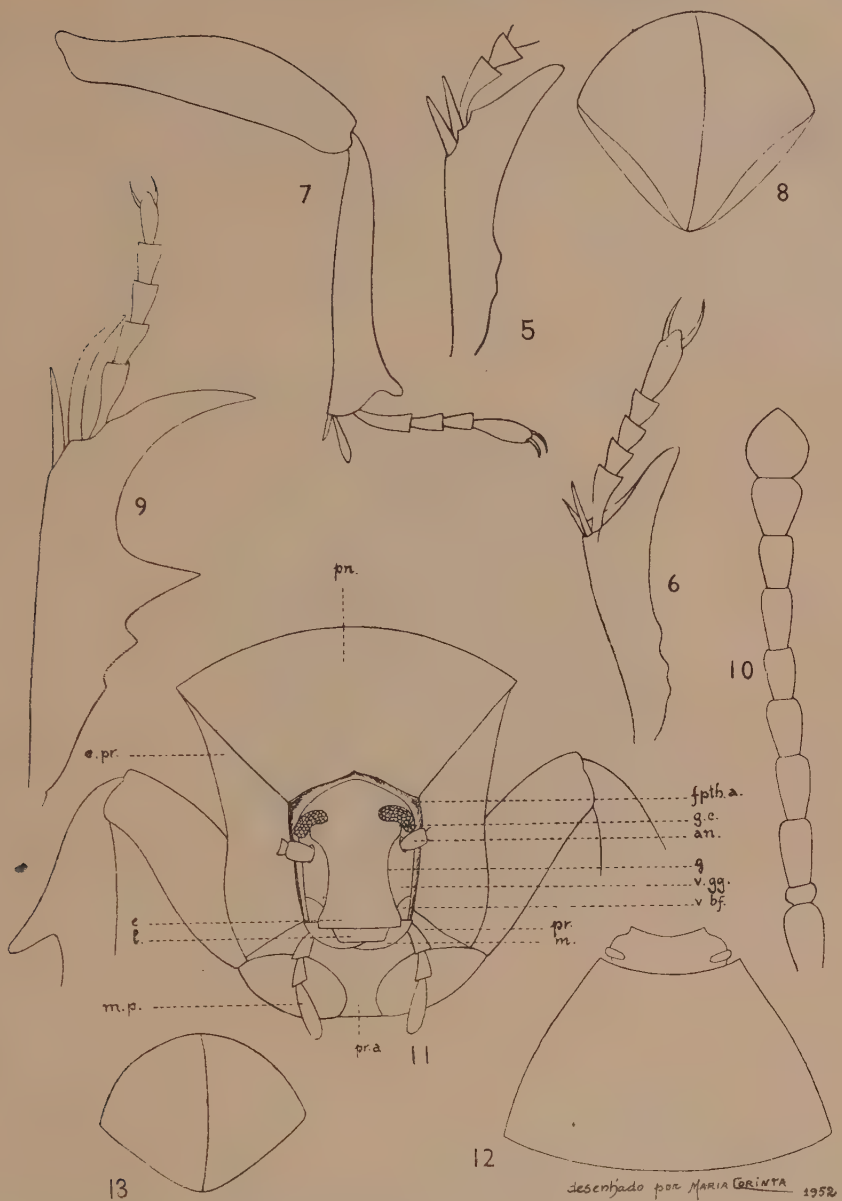
Cychrochile gen. n.

The new genus agrees with the horatomoid Cryptochilini in the simply truncate and not produced anterior margin of prosternum, and in the curved prosternal process. It is, however, sharply separated on the one hand from all the horatomoid Cryptochilini by the bicostate, *Cryptochile*-like elytra, on the other hand from all Cryptochilini by the *Erodius*-like anterior tibiae, which show, apart from the strong apical tooth, a strong and sharp median tooth at the outer edge, and, furthermore, by the extraordinarily small and cychroid head; the free insertion of antennae, wholly visible from above; the peculiar shape of the pronotum; the globular and hirsute elytra, which show a broad, convex and shiny epipleural ridge along posterior half; and finally by the very stout tibiae and subclavate femora. I place this remarkable new genus provisionally near to *Epipagus* Haag, 1872, as it agrees with the latter in the two enlarged apical joints of antennae and the complete marginal edge of the sides of pronotum.

Type species: *Cychrochile erodioides* sp. n.

Cychrochile erodioides sp. n. (figs. 9 to 14).

Subglobular, strongly convex, reddish brown, hirsute, with the derm entirely concealed by a dense layer of yellowish and brownish adherent scales. *Head* very small and narrow, perpendicularly hypognathous, with the posterior margin of underside embraced by the prothorax. Epistome depressed, transverse, distinctly demarcated from genae, with shallowly emarginate apical margin. Genae strongly raised, strongly converging forwards, leaving exposed the antennal insertion; the frontal portion of head, between genae, distinctly excavate. Vertex with a few obsolete granules. Maxillary palpi elongate; apical segment fusiform, one and a half times as long as the penultimate segment and distinctly longer than the third antennal segment. Antennae not reaching the pronotal base, with two apical segments strongly enlarged; the latter, taken together, almost as long as the three preceding segments combined; eighth segment one and a half times as long as broad; the penultimate segment longer than broad, a little longer than the third segment, a little shorter than the two preceding segments combined and about as long as the apical segment; the latter pointed apically. *Pronotum* transverse, strongly convex, broadest in front of posterior angles, there about two-thirds broader than long and at least three times as broad as head. Anterior margin shallowly emarginate, with



FIGS. 5–13.—5–8: *Cryptochile multicostata* sp. n. (5) and (6) Anterior tibia with tarsus, in different positions (schematic). (7) Posterior leg (schematic). (8) Contours of elytral convexity in caudal view. 9–13: *Cychrochile erodioides* sp. n. (9) Anterior tibia with tarsus (schematic). (10) Antenna (schematic). (11) Cephalic view (schematic): *pn.*, pronotum; *pr.*, prosternum; *e.pr.*, episternum of prosternum; *fpth.a.*, anterior foramen of prothorax; *pr.a.*, prosternal apophysis; *e.*, epistome; *g.*, gena; *g.c.*, genal canthus; *v.gg.*, lateral portion of the genal-gular surface on ventral part of head; *v.bf.*, lateral portion of the buccal fissure surface on ventral part of head; *l.*, labrum; *m.p.*, maxillary palpus; *an.*, insertion of antenna. (12) Pronotum with head, dorso-cephalic view (schematic). (13) Contours of elytral convexity in caudal view.

small and rectangular lateral angles. Sides almost subconically, straightly and strongly convergent from posterior to anterior angles; margin sharp and complete, densely ciliate. Base almost three times as broad as anterior margin, strongly bisinuate, with produced median portion, immarginate; posterior angles obtusely rounded, but strongly projecting outwards beyond elytral base. Integument covered with sharp, small and round granules, which are concentrated on disc each side of median line, sparse along median line itself, and very scattered on sides; each granule with a rather long, yellowish, semi-erect hair, which is inclined backwards; sides and median line with scaly stripes. Prosternum long, strongly sloping towards anterior margin, in front of coxal cavities one-half shorter than longitudinal diameter of coxal cavities; anterior margin truncate, simply carinate, without collar-like prolongation; episternum with a few very fine granules on upper one-third; intercoxal process narrow, bent downwards. *Elytra* glo-

Fig. 14.—*Crytochile erodioides* sp. n. Dorsal view.

bular, very strongly convex, with the contours of convexity, viewed from the sides, sloping towards base and perpendicularly declivous apically; broadest at middle and there not quite twice as broad as pronotum. Base without shoulders, narrower than pronotal base and closely united to it. Sides evenly rounded. Apical declivity steep, becoming slightly concave in front of apex; the latter not distinctly caudate. Each elytron, apart from the sutural row, with two fine and costiform primary rows on the disc, which divide the dorsal surface of elytra into three almost equal intervals, abbreviate posteriorly, ending approximately on top of apical declivity and being composed of very fine, almost continuous, long, costiform primary tubercles; the inner costa reaches the base, the outer one ends a short distance before the base; intervals covered with scattered, fine, round and irregular secondary granules, from which arise very long and erect hairs of a testaceous tint; the entire surface covered with a dense layer of fine, roundish, adherent, yellowish-grey scales, which change into obsolete patches of a transparent reddish-brown colour along the two discal costae and on disc; apical declivity, apart from the very fine sutural carina, without any other costal elements of sculpture, but sparsely covered with irregular

and fine secondary granules. Margin sharp, abbreviate posteriorly, ending on top of apical declivity, composed of two approximated rows of dense, fine, sharp and round granules, bearing a very long, testaceous ciliation ; the broad lateral dorsal interval with a rudimentary row not far from marginal edge, formed by a few, widely separated, fine and costiform granules. Pseudopleurae sharply separated from dorsal surface of elytra only at the basal two-thirds, with a few fine granules on basal two-thirds ; epipleural row complete, composed of fine, elongate and partially confluent granules. Mesosternum with an obtuse tubercle basally ; intercoxal process a little broader than mesocoxal cavities, two and a half times as broad as prosternal process. Metasternum comparatively long, between meso- and metacoxal cavities not shorter than the metacoxal cavities are long. The whole underside of afterbody densely covered with yellowish-grey scales and scattered granules, which are bare and shiny on episternal portions of meso- and metasternum. *Legs* very stout, hairy and covered with scales. Posterior femora clavate, barely longer than posterior tibiae. Anterior tibiae similarly shaped as in many Erodiini, with the outer edge produced into a strong and sharp tooth apically as well as at middle. Intermediate tibiae with a short and sharp apical tooth, covered with more or less strobiliform granules, as are also the posterior tibiae. Tibial calcaria strong ; those of posterior tibiae almost as long as the two basal segments of posterior tarsi taken together. Tarsi short ; posterior tarsi much shorter than posterior tibiae, with the basal segment a little longer than the distal segment. Length 7½ mm., width 5¼ mm., height 4¾ mm.

Holotype (sex not determined), Northern Bechuanaland : Lake N'Gami, (British Museum (Natural History)).

References.

Gerstaecker, A., 1862, *In* W. C. H. Peters *Naturw. Reise Mossambique* (*Zool.*), **5**, Paussidae to Chrysomelidae. Pp. 268–348, 6 pls. col. Berlin.

Gridelli, E., 1940, Coleotteri dell'Africa Orientale Italiana. 12 : Nuove specie di Tenebrionidi. *Ann. Mus. Stor. nat. Genova*, **60** : 459–468, 1 fig.

Haag, G., 1872, Monographie der Cryptochiliden. *Berl. ent. Ztg.* **16** : 273–313.

Koch, C., 1950*a*, Die Tenebrioniden des südlichen Afrikas. IV : Vier neue afrikanische *Himatismus*-Arten. *Ent. Arb. Mus. G. Frey*, **1** : 186–197, 1 plate.

—— 1950*b*, The *Tenebrionidae* of Southern Africa. II : Contribution to the knowledge of the Epitragini-genus *Himatismus*. *Ann. Mus. Congo belge*, 8vo. (*b*) **3** : 1–44, 12 pls., 2 figs.

—— (*in press*). The Tenebrionidae of Southern Africa. VI : The Angolan Cryptochilini. *Publ. Cult. Mus. Dundo.*

A NEW GENUS AND SPECIES OF EUPHORINAE FROM AUSTRALIA (HYMENOPTERA, BRACONIDAE).

By Arthur W. Parrott.

(Cawthron Institute, Nelson, New Zealand.)

WITH A NOTE ON ITS FEEDING HABITS.

By B. B. Given, F.R.E.S.

(Entomological Research Station, Nelson, New Zealand.)

Recently Mr. Bruce Given, Entomological Research Station, Nelson, submitted to me for determination two specimens of a braconid found, during his work on grass-grub parasites, associating with females of a species of thynnid in Victoria, Australia. A note by Mr. Given on the feeding habits of this braconid is contributed to the present paper.

Braconidae.

Euphorinae.

Euphoridae Foerster, 1862, *Verh. naturh. Ver. preuss. Rheinl.* **19** : 228 and 250.
Euphorinae Ashmead, 1900, *Proc. U.S. nat. Mus.* **23** : 115.
Meteorinae Ashmead, 1900, *Proc. U.S. nat. Mus.* **23** : 117.
Euphorinae Muesebeck, 1936, *Misc. Publ. U.S. Dept. Agr.* **241** : 4.

As considered here this subfamily includes the groups formerly treated as the Meteorinae and the Helorimorphinae. There appears to be a wide range of host relations in the subfamily, but all species are internal parasites.

Syntretoriana gen. n.

The new genus is allied to *Syntretus* Foerster as defined by Muesebeck (1936 : 22) and also shows affinities with *Euphoriana* Gahan. The following combination of characters will distinguish *Syntretoriana* from allied genera of the Euphorinae :

Head moderately large, sub-transverse; posterior ocelli far in front of posterior declivity; antennae stout, not very short and inserted at approximately the level of the middle of the eyes ; occiput and cheeks margined ; thorax somewhat narrower than head ; propodeum convex, posterior slope steep ; fore wings with cubitus, subdiscoidal and medius obliterated, radial cell short ; measured along anterior margin of wing it is not so long as the length of stigma, the latter broad ; abdomen petiolate, 1st tergite not elongated, spiracles situated slightly before middle and with dorso-lateral carinae strongly diverging from base to apex ; abdomen somewhat pyriform, sutures obsolete ; ovipositor exserted, very slightly decurved.

Type of genus = *Syntretoriana davidi* sp. n.

Syntretoriana appears to be closely allied to *Syntretus* Foerster but differs in the shorter radial cell, stouter antennae, scape longer than pedicel ; second abscissa radius evenly curved and first abdominal segment with spiracles slightly

before middle. It agrees with *Syntretus* in that the occiput is margined, the first cubital and first discoidal cells are confluent, the second intercubitus absent and the medius obsolete. In Muesebeck's key (1936 : 6) it runs to *Euphoriana* Gahan, but differs in the occiput being margined, the antennae not being inserted below the level of the middle of the eyes and in the shape of the propodeum ; the ocelli are somewhat larger and are more widely spaced than the species figured by Muesebeck (1936 : 3, fig. F) for *Euphoriana*. The wing venation is somewhat similar to *Microctonus* Wesmael, but the median vein is obliterated.

The following key will serve to separate *Syntretoriana* from the three above-mentioned genera :

KEY TO ALLIED GENERA.

1. Medius well developed throughout its length . . . **Microctonus** Wesmael
–. Medius obsolete, or very weak, at least towards base . . . . . 2.
2. Radial cell short, never longer than stigma measured along anterior margin of wing ; 2nd abscissa of radius curved . . . . . 3.
–. Radial cell long, always longer than the stigma measured along the anterior margin of wing ; 2nd abscissa of radius nearly straight **Syntretus** Foerster
3. Occiput not margined ; antennae inserted at a level below middle of eyes **Euphoriana** Gahan
–. Occiput margined ; antennae inserted at approximately the level of the middle of the eyes . . . . . **Syntretoriana** gen. n.

Syntretoriana davidi sp. n.

Female : 6 mm. long.

Colour : Head stramineous, except teeth of mandibles and ocellar area, which are black ; antennae entirely very dark-brown ; pronotum red-brown, except dorsally, which is black ; mesopleurae red-brown, black-marked along posterior border ; mesonotum red-brown, except for a triangular black mark on posterior border with its apex extending medially forwards ; metapleurae, scutellum and post-scutellum black ; legs yellow-brown, posterior coxae for the greater part black or deeply infuscated ; apical tarsal joints and claws infuscated ; abdomen and ovipositor black ; stigma and veins very dark brown, almost black.

Head (fig. 1) sub-transverse, face wider than long, finely punctate; a deep fovea between face and clypeus, anterior margin of latter truncated and faintly reflexed ; mandibles elongated, narrow, upper tooth nearly twice as long as lower ; malar space about or slightly less than basal width of mandibles ; eyes small, interior margins not emarginate, diverging below antennae ; cheeks wide, in profile about $1\frac{1}{2}$ times as wide as eye ; vertex, occiput and cheeks glabrous ; face sparsely pilose, with a fringe of long hairs on clypeus ; antennae 27-jointed, flagellum segments thick, all segments subequal in length, except 1st, which is elongated and narrowed basally, the apical segment slightly longer than the preceding ones, and tapering towards apex; all segments setiferous; scape, elongately oval, strongly punctuate; distance between posterior ocelli somewhat shorter than ocellocular space, lateral-ocellar space about half the postocellar space ; pronotum with vertical coarse aciculations ; mesopleurae impunctate, glabrous except on sub-alar tubercle and along anterior border, which is finely punctate; metapleurae clothed with long fine hairs; mesonotum impunctate, glabrous, notauli impressed anteriorly, obsolete posteriorly ; scutellar fovea wide, shallow and smooth; scutellum slightly convex, glabrous, impunctate, lateral carinae absent; propodeum glabrous, very minutely and sparsely punctate, convex, posterior three-quarters sloping steeply ; entirely smooth except for lateral carinae, which are indicated posteriorly, defining the petiolar area laterally, and which is slightly concave ; spiracles small and circular ; abdomen petiolate ; 1st tergite not long or very thin, sides diverging from base to apex,

spiracles situated before middle, laterally carinate ; abdominal sutures obsolete ; entire abdomen highly polished with a few transverse rows of fine hairs indicating the obsolete sutures ; ovipositor exserted, slightly decurved, stout, sparsely clothed with long fine hairs, the length of the sheaths equal the length of the 1st abdominal tergite, which nearly equals the greatest depth of the abdomen ; posterior coxae large, combined length of coxae and trochanter greater than length of 1st tergite ; posterior femora stout, a little over one-third as wide as long ; tibiae greatly thickened apically, spurs stout, about three-quarters the length of the metatarsus, the latter subequal to the 2nd and apical tarsal segments ; claws small, strongly bent, not visibly pectinate.

Wings as figured (fig. 1*b*, *c*).

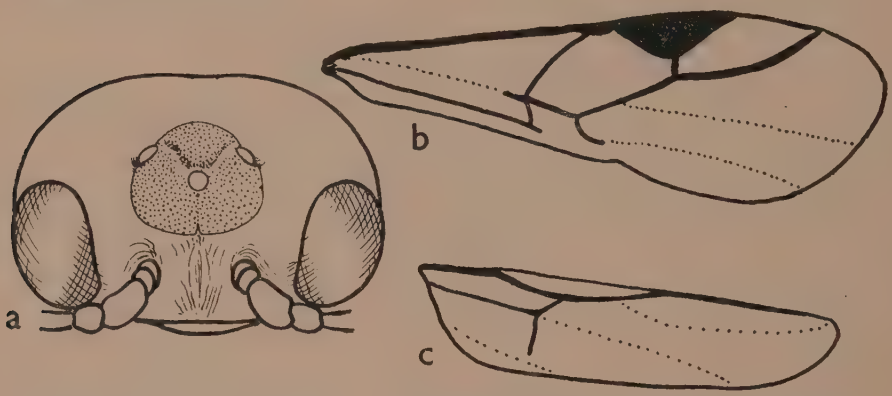


Fig. 1.—*Syntretoriana davidi* sp. n. (*a*) Dorsal view of head ; (*b*) fore wing ; (*c*) hind wing.

Holotype ♀, Australia : Wannon, Victoria, 4.x.51 (*B. B. Given*). (In Collection of the Division of Entomology, D.S.I.R.O., Canberra, Australia.)

Paratype, ♀, with same data. (In Collection of the Cawthron Institute, Nelson, New Zealand.)

A NOTE ON THE FEEDING HABITS OF *SYNTRETORIANA DAVIDI* PARROTT.

By B. B. Given.

While collecting Thynninae for consignment to New Zealand for attempted control of pasture scarab pests during the spring and early summer of 1951, several small braconids were noted in the tubes when sorting and packing the wasps on return to the laboratory. These foreign insects were destroyed. However, so persistently were they found to be associated with a particular thynnid species (referred to in records as No. 24, and probably a *Phymatothynnus* sp. according to Turner (*Genera Insectorum*, fasc. 105)) that observations were made in the field.

The braconid was observed to settle on the leaves of *Eucalyptus* sp. sprayed with honey water and then to fly to feeding thynnid pairs, settling on the thorax of the male. When the male thynnid had finished gathering honey and had commenced regurgitation, the commensal crawled over the side of its head and robbed it of part of its food droplets. This behaviour was noted on several occasions, and two female braconids were ultimately collected and given to Mr. Parrot for identification. No males were noted in the area.

KIRBY'S TYPES OF NORTH AMERICAN CARABIDAE (COLEOPTERA).

By Carl H. Lindroth

(*Zoological Institute, The University, Lund, Sweden*).

One of the earliest works on North American entomology is Part IV of John Richardson's *Fauna Boreali Americana* (1837) written by William Kirby and dealing entirely with insects. The larger part of the species mentioned therein were described for the first time.

Most of the material dealt with was collected during the expedition of 1825–1826, under the command of Sir John Franklin, and with Richardson as chief naturalist. But most of the entomological work was done by the assistant naturalist, Mr. Drummond, " to whose unrivalled skill in collecting, and indefatigable zeal, we are indebted for most of the insects . . . " (Richardson, 1829 : XVI). No exact dates or localities are given by Kirby for the different species, but the latitude in which they were found is often indicated. A map of the expedition route in 1825–26 (fig. 1), compiled according to Richardson (1829 : XIV–XVIII), may help to translate these statements into more accurate geographical areas. Thus, " lat. 65°," which occurs frequently, apparently means the region of Great Bear Lake, and " lat. 54°," still oftener used, the stations along River North Sasketchewan, where Drummond collected intensively.

When Kirby's work appeared the North American Coleoptera were very imperfectly known, for the most part only from the papers of Say and Dejean, and then mainly from the more southern regions of the Continent. It was therefore safe to assume that most of Kirby's new species were in fact new and his names consequently valid. For this reason several of the leading coleopterists who followed, in the first place John L. Leconte and G. H. Horn, attempted an interpretation of Kirby's species. In the years 1870–1875 Bethune published a complete reprint of the coleopterous part of Kirby's treatise in *The Canadian Entomologist*, and added notes on the opinion of that time, i.e., of Leconte and Horn, as to the taxonomic position of every species. At the end of this serial reprint, in 1876, Horn summarised his opinion on the Kirby species, in many points different from that given by Bethune. Horn had an opportunity of studying the Kirby types in London, and so did Leconte on two occasions. Two papers by the last-named (1870, 1873) gave his interpretation of the more or less dubious species. Later coleopterists, particularly T. L. Casey, have also studied and revised the Kirby species. The catalogues of Leng (1920, with supplements) and Junk and Schenkling (Csiki, 1927–1933) summarise the present position.

In the Carabidae Kirby listed and described 92 species, no less than 62 as new. In spite of the revisions by later authors mentioned above, several of these have remained uninterpreted or at least doubtful. I therefore decided to re-examine the Kirby types of Carabidae and for that purpose spent ten days at the British Museum (Natural History), in August, 1952. Mr. E. B.

FIG. 1.—Map showing the route of the Franklin expedition in 1825–26. Drummond's separate journey marked as a continuous line. Main collecting stations indicated.

Britton, in charge of the Coleoptera, did everything in his power to help me and, in fact, original specimens of all the 62 Kirby species were found, some of them defective, but none to such a degree as to prevent a reliable identification.

Kirby, like his contemporaries, did not designate type specimens. This was done later by some member of the British Museum staff: most of the original specimens of Kirby species have been marked " types " or " cotypes." These designations, however, cannot be accepted without careful comparison with the orginal description, e.g., in the case of *Cymindis marginatus* and *Trechus similis* the wrong specimen of two has been selected as " type."

In the following account the species are listed in the same order and under the same name as in Kirby's treatise.

If not otherwise stated all Kirby specimens are labelled " North America " only.

Cicindela proteus. Type ♂ and 1 ex. " var. b," both = *duodecim-guttata* Dej., as generally accepted. The penis of the type shows the characteristic outer form and complicated inner armature of the species.

C. albilabris. Type ♂, " Nova Scotia," = *longilabris* Say, the black non-metallic main form, as generally accepted.

Cymindis marginatus. 2 ♂, the paler ex. (with uniformly brownish elytra) labelled " type," which is wrong according to the description. Both = *cribricollis* Dej. The asymmetric penis of the " type " is very characteristic, and also the inner armature. Leconte (1873) had already established the synonymy here given, but Leng (1920) listed *marginatus* Kirby as a separate species until, by a mistake, in Suppl. III (1933) it was made a synonym of *brevipennis* Zimm. (*marginata* Chd., *nec* Kby.).

C. unicolor. Type ♀, immature, = *unicolor* auct. (*hudsonica* Lec.).

Sericoda bembidioides. Type ♀ = *Agonum* (*Agonodromius*) *bembidioides* auct. (*cicatricosum* Motsch.).

Calosoma frigidum. Type ♀ = *frigidum* auct.

Helobia castanipes. 1 immature ♀, very defective (antennae, except the first two segments, and abdomen lacking), is no doubt the type although not so marked. The prothorax shows that it is *Nebria moesta* Lec. 1850 (*labradorica* Csy. 1920), and Kirby's name is valid. This form is now regarded as a subspecies of the palaearctic *gyllenhali* Schh. (Bänninger 1925 : 261, 279; Holdhaus and Lindroth 1939 : 133–134) and has nothing to do with *sahlbergi* Fisch.

Chlaenius impunctifrons. Type ♂ = *pennsylvanicus* Say, as generally accepted.

C. quadricollis. Type ♀, " Canada," = *tricolor* Dej., as generally accepted. The prothorax is a little broader than normal and the blue colour of the elytra has almost disappeared, but the labrum is just visibly emarginate in front and it therefore cannot be *brevilabris* Lec., as originally assumed by Leconte (1870 : 397 ; cfr. 1873 : 325).

C. cordicollis. Type ♀; a ♂, labelled " Canada," is probably a cotype. Both belong to *leucoscelis* Chevr. subsp. *cordicollis* (*sensu* Darlington 1935). The profemur of the ♂ specimen is not angulated. Casey (1920 : 293) regarded *cordicollis* as specifically distinct, and, in fact, the penis of the two forms is so different that this must be so (fig. 2).

Agonum picipenne. Type ♀ = *thoreyi* Dej. (*gemellum* Lec.). "Var. b," 1 ex. without head and prothorax, is probably the same. "Var. d," ♀ = *gratiosum* Mnh. (*lene* auct. *nec.* Dej., *ruficorne* Lec. *nec* Gze.), according to the description, also "var. c," which was not represented in the collection. The interpretation of "var. c et d" is generally accepted (cf. Leconte 1873 : 323 ; Horn 1876 : 128), but the species known as "*Agonum* (*Europhilus*) *picipenne*" must become *dilutipenne* Motsch.

Fig. 2.—Side view and apex of penis : *a*, *Chlaenius leucoscelis* Chevr. (Pinal Mts., Ariz.) ; *b*, *C. cordicollis* Kby. (Isle Perrot, Que.).

A. sordens. Type ♀ = *sordens* auct. (*picicorne* Lec.). I was unable to find any description of "*fuscescens* Chd.," doubtfully referred to by Leconte (1873 : 323) and Horn (1876 : 128).

A. seminitidum. 1 ♂ ("type"), 2 ♀ (1 "var. b"), all = "*cupreum* Dej." (according to specimens named by Darlington and van Dyke). The penis of the macropterous "type" is very characteristic (fig. 3*a*), and agrees completely with that of a brachypterous male from Colorado (Little Willow Creek).

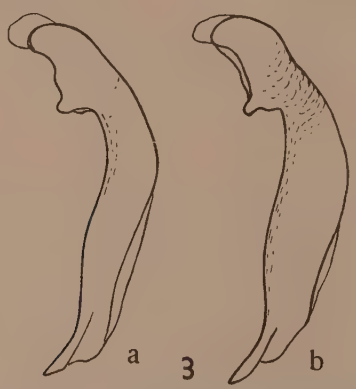


Fig. 3.—Penis of : *a*, *Agonum seminitidum* Kby. (Little Willow Creek, Col. ; penis comp. with type) ; *b*, *A. sp.* (Duluth, Minn.).

Dr. Darlington kindly examined for me the genitalia of the male type of *protractum* Lec., 1854, and of a male paratype of *chalceum* Lec., 1848, and after comparison with my drawing of *seminitidum* (fig. 3*a*) considered both of them to be synonyms, as generally accepted. Whether the *cupreum* of Dejean, 1831, is also conspecific at least remains doubtful (cf. Casey 1920 : 109) and can be stated on the type only. There is a second, closely related species from the same region which also must be taken into consideration. It lacks the raised basal margin of prothorax, characteristic for *seminitidum*, and has a clearly different penis (fig. 3*b*). It is possibly the same as *marquettense* Csy., 1920.

A. simile. 2 ♀, one marked as type. Both are identical and belong to a *Europhilus* unknown to me but closely related to *consimile* Gyll. (*invalidum* Csy.) and *exaratum* Mnh. (*aldanicum* Popp.). It is separated by the broad, convex prothorax, with obliterated hind angles.

A. affine. Type ♂ = *carbo* Lec. and thus valid. The penis is very characteristic. This synonymy is most unfortunate, because *affine* has hitherto generally been regarded as identical with *harrisi* Lec., which now becomes valid. I propose to keep the name *affine* suppressed until the new nomenclature has become established.

A. erythropum. The single type is in very bad condition and the sex could not be stated, but the identity with *errans* Say is certain. Compared with specimens from Alberta, Manitoba and N. Dakota.

Platyderus nitidus. 2 ♀, one labelled as type, both = *Pterostichus* (*Pseudargutor*) *leconteianus* Lutsh. (*erythropus* Dej. nec Mrsh.) as generally accepted.

Argutor bicolor. Only 1 ♂ type present, though Kirby states he has seen at least 3 ex. The type lacks head and adomen but, without any doubt, it is an immature *Pterostichus* (*Argutor*) *patruelis* Dej., as generally accepted.

A. femoralis. 2 ♂ (1 marked as type) and a third, quite defective ex., all = *Pterostichus* (*Argutor*) *femoralis* auct.

A. mandibularis. Type ♂, unfortunately without abdomen. This is quite different from what is generally known as "*Cryobius mandibularis*" in North America (cf. *brevicornis*, below). It is brilliantly brassy green above, especially the elytra, and has bright yellowish-red legs. The antennae are darkened, beginning at the second segment (the palpi uniformly bright). The first two segments of the hind tarsi are distinctly furrowed externally (in *brevicornis* at most a trace of furrows). The head is larger and the hind angles of the prothorax obtuse. I am unable to decide whether, and, if so, under what name, this species was known previously.

The type of Kirby's "var. b" is the female of a species different from both *mandibularis* and *brevicornis*, being quite unmetallic. It is separated from the former by the smaller head, almost rectangular hind angles of prothorax, pronounced shoulder-tooth of elytra and 3 pale basal segments of antennae, and from the latter *inter alia* by the more convex prothorax (especially in the area between the basal fovea and side margin) and by the strongly furrowed two basal segments of the hind tarsi.

Neither of Kirby's two *mandibularis* forms has more than a barely visible vestige of outer basal impressions of the prothorax, and therefore can hardly be identical with *hudsonicus* Lec. or *labradorensis* Chd. (cf. Poppius, 1906).

A. brevicornis. One pair, the ♂ labelled as type. Genital slide of the

♂ compared with that of the ♂ type of *fastidiosus* Mnh. (Kenai, Mus. Hfors). They are certainly conspecific. The only difference seems to exist in the prothorax, which in *brevicornis* is a little broader in the frontal half and therefore more markedly heart-shaped. Specimens from E. of Hudson Bay (Labr., Nfld., N.H.), generally known as "*mandibularis* Kby.," have slenderer palpi which are uniformly pale (also the tarsi are lighter), but according to the penis they are conspecific, though probably forming a distinct subspecies. The taxonomy of the subgenus *Cryobius*, as a whole, is very confused.

Omaseus picicornis. One pair, the ♀ being the type, though not marked as such, both = *Pterostichus* (*Dysidius*) *mutus* Say, as generally accepted.

Stereocerus similis. One pair, the ♂ marked as type, both = *Pterostichus* (*Stereocerus*) *haematopus* Dej., as generally accepted.

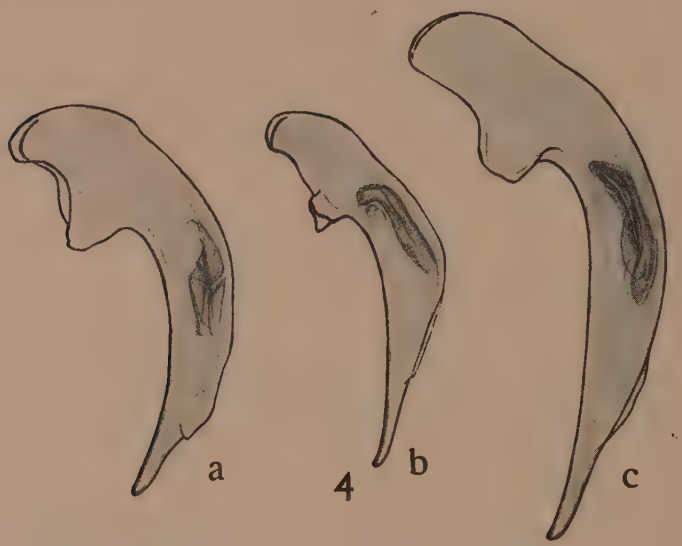


Fig. 4.—Penis of: *a*, *Amara erratica* Dft. (Red Rocks, Nfld.); *b*, *A. laevipennis* Kby. (type); *c*, *A. patruelis* Dej. (Grand Falls, Nfld.).

Curtonotus rufimanus. Type ♂ = *Amara* (*Cyrtonotus*) *torrida* Ill. (*reflexa* Putz., *cylindrica* Lec.), and has nothing to do with *lacustris* Lec. as usually proposed. The penis is quite different.

C. brevilabris. Type ♂. An additional ♀ probably belongs to *rufimanus*, as Kirby states he had seen 1 ex. of *brevilabris* only, but several of *rufimanus*. Both = *Amara* (*Cyrtonotus*) *torrida* Ill. (penis slide made).

C. latior. Type ♀ = *latior* auct.

Poecilus castanipes. Type ♀, one additional pair of which the ♀ is marked as cotype, which must be an error, as Kirby made his description after 1 ex. only. All = *Pterostichus* (*Poecilus*) *lucublandus* Say. The type, contrary to the author's statement, is not "entirely black," but has a pronounced blue lustre on the sides of prothorax. The reduced number of 3 dorsal punctures of elytra may occur also in *lucublandus* (against Schaupp, 1882), sometimes 3 on the one, 4 on the other elytron.

Amara inaequalis. Type ♀ = *patruelis* Dej. *A. interstitialis* Dej. is a distinct species.

A. pallipes. Type ♂ = *pallipes* auct.

A. laevipennis. 2 ♂, one labelled as type, the other defective without abdomen. It is a member of the subgenus *Celia*, distinct from *erratica* Dft., with which it has hitherto been included. The penis is clearly different (fig. 4). External differences are: shorter, less "swollen" first antennal joint; flatter, less prominent eyes; more protruding front angles of the prothorax. The size is only 6·7 mm.

Fig. 5.—*Harpalus basilaris* Kby., penis (San Juan Valley, N.M.; comp. with type, apex slightly slenderer).

Fig. 6.—*Harpalus ochropus* Kby., penis (type).

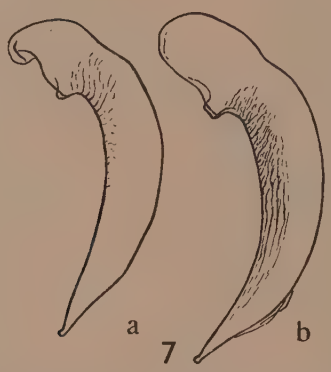
A. discors. Type ♀ = *gibba* Lec. as originally stated by Leconte (1870): 397), though subsequently regarded as a synonym of *chalcea* Dej. (Leconte 1873 : 324; Horn 1876 : 129) or *remotestriata* Dej. (Leng 1920; Csiki : 444). Kirby's name is valid.

Harpalus pleuriticus. Type ♂ and 2 additional ♀, all = *pleuriticus* auct. The armature of the internal sac of the penis is very characteristic.

H. basilaris. Type ♂ and additional ♀, both = *basilaris* auct. (*obesulus* Lec.). The penis is very characteristic, stout and straight (fig. 5). The identity with *obesulus* was stated by Leconte himself (1870 : 397; 1873 : 325) and there is no reason for the doubt expressed by Casey (1914 : 128).

H. ochropus. Type ♂. *desertus* Lec. has been regarded (e.g., by Leng 1920 : 71) as a doubtful synonym. I sent a description of the Kirby type to Dr. Darlington, who compared it with the single *desertus*-type, unfortunately a ♀. A second ♀ (from N. Mex.), closely agreeing with this type, was sent me by Dr. Darlington. The most important differences seem to be : *desertus* has the front angles of the prothorax less protruding and its base around the broader and shallower foveae more or less punctate. The shoulder angles of the elytra are more prominent ; the 7th interval has 2–3 accessory punctures at the tip. A ♂ from Color., deviating in minor details from the *desertus*-♀ but almost certainly belonging to the same species, has a penis essentially different from that of *ochropus* (fig. 6).

H. interpunctatus. Type ♂ and 2 additional ♀, all = *Anisodactylus nigrita* Dej. (cf. Horn, 1880 : 171). The clypeus has two pairs of setigerous punctures.[1] The "*interpunctatus*" auct. has a more arcuate penis (fig. 7) more strongly pigmented in the apical half and with rough longitudinal sculpture on the



7

Fig. 7.—Penis of : *a*, *Anisodactylus nigrita* Dej. (*interpunctatus* Kby. ; Bethel, Me.) ; *b*, *A. kirbyi* nom. nov. (*interpunctatus* auct. ; Cheticamp, N.S.).

surface. As no name seems available for this species I propose the name **kirbyi** nom. nov.

H. longior. 2 ♂, one labelled "type," the other "var. b," both = *Harpalus* (*Pseudophonus*) *pennsylvanicus* DeG. The penis has a characteristic form. Kirby's species has wrongly been regarded as identical with *longicollis* Lec. (Horn 1876 : 129 ; Hatch 1932 : 174).

H. laticollis. Type ♀ (labelled as ♂) = *Anisodactylus nigerrimus* Dej. as generally accepted.

H. rotundicollis. Type ♀ = *amputatus* Say, an unmetallic ex. with the characteristic sutural tooth at the tip of elytra. According to Casey (1924 : 96) the two names represent two different species. One additional ♀, not labelled as cotype, = *Xestonotus lugubris* Dej., but only the first ex. fits Kirby's description in respect of the colour of the antennae and legs, and also the truncation of the elytra at the tip.

[1] This character is not quite constant in *Anisodactylus*. I have seen 1 ♂ of *nigerrimus* Dej. from Halifax, N.S., with only one setigerous puncture on each side of clypeus.

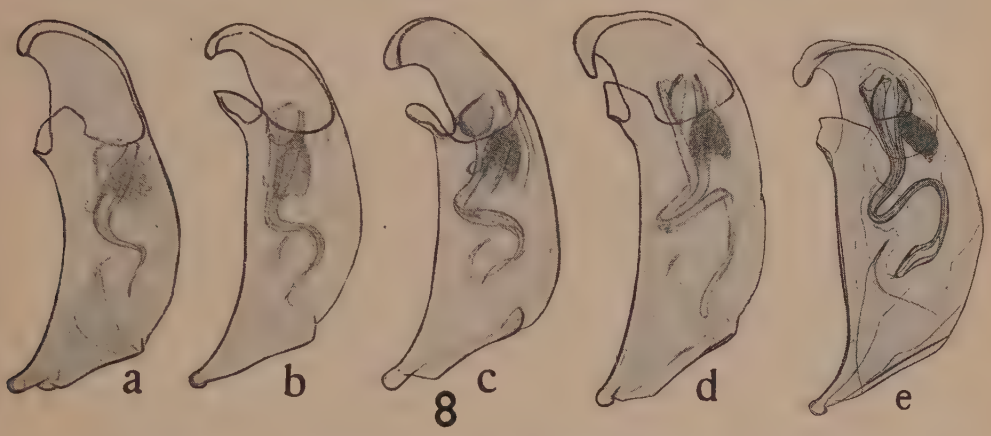
H. stephensii. Type ♂ = *amputatus* Say, a brilliantly green ex., as generally accepted.

Stenolophus versicolor. Type ♂ and 2 additional ♀, all = *fuliginosus* Dej., as generally accepted. The internal sac of the penis contains immense, very characteristic teeth.

Trechus tibialis. Type ♂ = *Tachycellus nigrinus* Dej., as generally accepted.

T. ruficrus. Type (? ♀) = *Trichocellus cognatus* Gyll. There is no reason to retain *ruficrus* even as var. or ab. (cf. Casey 1914 : 227 ; Leng, 1920, and Csiki : 1223).

T. flavipes. One pair, the ♀ marked as type, both = *Bradycellus* (*Stenocellus*) *rupestris* Say, with characteristic outer form and inner armature of penis. This synonymy is generally accepted, but Kirby's name was at the same time listed as a synonym of *Trechus hydropicus* Horn by Leng.



8

FIG. 8.—Penis of: *a*, *Bembidion lunatum* Dft. (Göteborg, Sweden); *b*, *B. bimaculatum* Kby. (type); *c*, *B. sordidum* Kby. (Red River, Man.; comp. with type ♀); *d*, *B. postremum* Say (Rumney, N.H.); *e*, *B. macropterum* J. Sahlb. (Dudinka, W. Siberia). The penes of these species, to a certain degree, represent a morphological series.

T. immunis. Type ♂ and 2 additional ♀, all = *Stenolophus conjunctus* Say., as assumed by Leconte (1873 : 325) and Horn (1876 : 130). Later regarded as a doubtful synonym of *Acupalpus carus* Lec.(Casey, 1914 : 268).

T. similis. 2 ex.: ♂, with red prothorax, labelled as type; ♀, with dark spot on the disc. In fact, the latter ex. should be regarded as the real type, and the ♂ as Kirby's " var. b." Both = *Agonoderus comma* Fbr., auct. The armature of the internal sac of the penis is extremely characteristic. Casey (1914 : 240) made *similis* a synonym of *Tachycellus* (*Triliarthrus*) *atrimedius* Say.

Isopleurus nitidus. Type ♂ = *Amara* (*Celia*) *subaenescens* Cki. (*subaenea* Lec. *nec* Sturm, *nec* Steph.), as stated by Leconte (1873 : 324) and Horn (1876 : 130); Kirby's name is not found in Leng, nor in Csiki (1927–33). It is preoccupied by *Amara* (s.str.) *nitida* Sturm, 1825.

Peryphus bimaculatus. 2 ♂, one marked as type. The type has an unusually broad prothorax with rough basal sculpture, but the penis proves that both ex. belong to *Bembidion* (*Peryphus*) *bimaculatum* auct. (fig. 8). In the

closely related *postremum* Say the " hose " of the internal sac is longer and more bent.

P. sordidus. Single type ♀, immature. The name has always been treated as a synonym of the foregoing species, but this is not correct. In fact it is a separate species, well characterised even in Kirby's original description. The penis of a ♂ from Red River, Man., externally agreeing with the type, shows clear differences in the internal armature (fig. 8). *Bembidion* (*Peryphus*) *sordidum* Kby is a valid name and I know of no synonym.

P. scopulinus. 2 ♀, one marked as type, both = *Bembidion* (*Peryphus*) *scopulinum* auct.

P. rupicola. One pair, the ♂ labelled as type. Both belong to the species generally passing as " *lucidum* Lec.," as already stated by Fall (1926 : 133). The ♀ above bears a label in Fall's characteristic hand-writing : " *Bembidium rupicola* Kirby, co-type." Kirby's name is valid and, in fact, has no synonym because *lucidum* Lec. = *petrosum* Gebl. (*substrictum* Lec.). Formerly *rupicola* was regarded as a synonym or variety of *tetracolum* Say (e.g., Bethune, 1870 : 171) and this interpretation has recently been revived by Fassati (1950) on the basis of a reputed cotype, identified by Netolitzky. As far as known, *ustulatum* L. (*tetracolum* Say) does not occur in the regions from which Kirby's material emanated, at least not in 65° latitude (from where *rupicola* was reported), and I strongly doubt the locality of the " cotype " in question.

P. picipes. One pair, the ♀ (without abdomen) marked as type, both = *Bembidion* (*Pheryphus*) *grapei* Gyll. (*nitens* Lec.) as already suggested by Fall (1926 : 133). The ♂ has a penis completely agreeing with that of European specimens (Lindroth, 1939–40, fig. 18). Kirby's name has usually been used for a quite different species which must now be called *lacunarium* Zimm. (*plagiatum* Zimm., regarded as a synonym, is different).

P. concolor. Single type ♀ = *Bembidion* (*Hirmoplataphus*) *longulum* Lec. This is very unfortunate and, as in the case of *Agonum affine*, I propose to suppress Kirby's name until *salebratum* Lec. has time to establish itself in place of " *concolor* " in its old sense.

P. nitidus. Type ♀ = *Bembidion* (*Pogonidium*) *nitidum* auct. (*vide* Netolitzky, 1912–43 : 26).

Tachyta picipes. One pair, on the same pin, = *inornata* Say *sensu* Csy., 1918 (*nana* auct. amer. *nec* Gyll.) as generally accepted. The penis agrees with that of *nana* Gyll., of which *inornata* may be regarded as a subspecies.

Notaphus nigripes. One pair, the ♂ marked as type, = *Bembidion* (*Notaphus*) *nigripes* auct. Mannerheim (1852 : 300) cited the name in error (for *incrematum* Lec.), according to original specimens.

N. intermedius. Type ♀ = *Bembidion* (*Notaphus*) *patruele* Dej. Fall (1926 : 133) was therefore right in opposing the usual synonymisation with *rapidum* Lec., which consequently becomes valid.

N. variegatus. One pair, the ♂ (defective) marked as type, a second ♂ labelled " S. of L. Winnipeg," all = *Bembidion* (*Notaphus*) *decipiens* Dej. (*versicolor* Lec. *nec* Csy.), as usually supposed. The male from Winnipeg shows the characteristic inner structure of the penis.

Opisthius richardsoni. Type ♂.

Elaphrus clairvillii. Type ♀ = *clairvillei* auct. (*politus* Lec.).

E. intermedius. 3 ♀, one labelled as type and moreover : " Gr. Bear L.," all = *riparius* L., as generally accepted.

E. obscurior. Type ♀ (without abdomen). It is a quite typical *lapponicus* Gyll. (*obliteratus* Mnh.) of the small, slender form occurring in Labrador.

Omophron saii. 1 ♀ from the Kirby collection is probably the type. A genital slide was made from 1 ♂, labelled " Lake Huron, Dr. Bigsby," and possibly also belonging to the original series. The agreement with *americanum* Dej. is complete, as generally accepted.

References.

Bänninger, M., 1925, Neunter Beitrag zur Kenntnis der Carabinae : die Nebriini. *Ent. Mitt.* **14** : 180–195 ; 256–281 ; 329–343.

Bethune, C. J. S., 1870–75, Insects of the northern parts of British America. From Kirby's Fauna Boreali-Americana : Insecta. *Canad. Ent.* **2–7**.

Casey, Th. L., 1914, 1920, 1924, *Memoirs on the Coleoptera.* V, IX, XI. Lancaster, Pa.

Csiki, E., 1927–33, *Carabidae.* **1–3**. *In* Junk and Schenkling : *Coleopterorum Catalogus.* Berlin.

Darlington, P. J., Jr., 1934, The subspecies of *Chlaenius leucoscelis* Chev. (Col., Carabidae), with a note on a function of museums. *Pan-Pacif. Ent.* **10** : 115–118.

Fall, H. C., 1926, A list of the Coleoptera taken in Alaska and adjacent parts of the Yukon Territory in the summer of 1924. *Ibid.* **2** : 127–154 ; 191–208.

Fassati, M., 1950, Concerning *Bembidion ustulatum* L. in North America (Carabidae). *Coleopt. Bull.* **4** : 38–43.

Hatch, M. H., 1932, The *pennsylvanicus* group of *Harpalus. Bull. Brooklyn ent. Soc.* **27** : 173–176.

Holdhaus, K., and Lindroth, C. H., 1939, Die europäischen Koleopteren mit boreoalpiner Verbreitung. *Ann. naturh. Mus. Wien* **50** : 123–293.

Horn, G. H., 1876, Synonymy of the Coleoptera of the Fauna Boreali-Americana, Kirby. *Canad. Ent.* **8** : 126–130 ; 150–151 ; 166–170 ; 190–193.

——, 1882, A review of the species of *Anisodactylus,* etc. *Proc. Amer. phil. Soc.* **19** : 162–178.

Kirby, W., 1837, *The Insects. In* Richardson, *Fauna Boreali-Americana* **4**. Norwich.

Leconte, J. L., 1870, Synonymical notes on North-American Coleoptera. *Ann. Mag. nat. Hist.* (4) **6** : 394–404.

——, 1873, Synonymical remarks upon North American Coleoptera. *Proc. Acad. nat. Sci. Philad.* **1873** : 321–336.

Leng, Ch. W., 1920, 1933, *Catalogue of the Coleoptera of America, north of Mexico.* With suppl. III. Mount Vernon, N.Y.

Lindroth, C. H., 1939–40, Zur Systematik fennoskandischer Carabiden : 4–12. Bembidion-Studien. *Notul. Ent., Helsingf.,* **19** : 63–99.

——, 1943, Zur Systematik fennoskandischer Carabiden : 13–33. *Ent. Tidskr.* **64** : 1–68.

Mannerheim, C. G., 1852, Zweiter Nachtrag zur Kaeferfauna der Nord-Amerikanischen Laender des Russischen Reiches. *Bull. Soc. Nat. Moscou* **25** (1) : 283–387.

Netolitzky, Fr., 1942–43, Bestimmungstabelle der *Bembidion*-Arten des paläarktischen Gebietes. *Koleopt. Rdsch.* **28, 29.**

Poppius, B., 1906, Zur Kenntnis der Pterostichen-Untergattung *Cryobius* Chaud. *Acta Soc. Fauna Flora fenn.* **28** (5) : 1–280.

Richardson, J., 1829, *Fauna Boreali-Americana* **1**. London.

Schaupp, F. G., 1882, On the species of Pterostichi, Bon. *Bull. Brooklyn ent. Soc.* **5** : 9–11.

NEW CRAMBINE GENERA ALLIED TO *DIATRAEA* GUILDING (LEPIDOPTERA: PYRALIDAE).—I.

By Harold E. Box, F.R.E.S., F.R.G.S.

A compact homogeneous group of four species may be separated from *Diatraea* Guilding (1828, *Trans. Soc. Encour. Arts* **46**: 148) and defined as follows:

Eodiatraea gen. n.

Type-species: *Chilo centrellus* Möschler.

Venation as in *Diatraea* Guild. General colour of body and fore wing pinkish buff or greyish buff tinged with pinkish (not yellowish or brownish), irrorated with individual fuscous scales. Frons prominent, flat on top, sharply pointed. Second abdominal segment of male without lateral retractile processes ("hair-tufts"); hind tibia of male without tuft of hair-like scales.

Male genitalia with a smooth, slender, rod-like projection from the upper (inner) margin of the harpes, quite different from the rounded knob-like basal projection present in many species of *Diatraea*; tegumen narrow, even, without lobes; anellus with the arms long and slender, flattened, not divided at or near apex, sharply pointed. *Female genitalia* without a strongly chitinized rim and without chitinised papillose-setose lobes in front of (below) the genital opening; ductus bursae short, cylindrical, rather strongly chitinised; bursa not elongate. Genitalia of this type are figured by Dyar and Heinrich, 1927, and Box, 1931 (see systematic references below).

The larvae are borers in graminaceous plants, including sugar-cane (introduced in the New World), but not to any extent in maize. Those of three species, viz., *centrella*, *amazonica* and *rufescens*, have been examined. They all agree in the shape of the chitinised transverse shields on the mesothorax and metathorax, which are triangular.

Eodiatraea centrella (Möschler) comb. nov.

Phalaena sacchari Sepp, 1848, *Surinamsche Vlinders n.h. Leven Geteekend* **2**: 135, pl. 64 (Surinam) [nec *Crambus sacchari* Fabricius, 1798, *Suppl. Ent. Syst.*: 469, = *Diatraea saccharalis* (Fabr.)]

Chilo centrellus Möschler, 1883, *Verh. zool.-bot. Ges. Wien* **32** (1882): 360, t. xviii, f. 45 (Surinam: Paramaribo).

Diatraea canella Hampson, 1895, *Ann. Mag. nat. Hist.* (6) **16**: 349 (Grenada, B.W.I.), **syn. nov.**; Dyar and Heinrich, 1927, *Proc. U. S. nat. Mus.* **71**, no. 2691: 20, f. 13 (♂), f. 60 (♀); Box, 1931, *Bull. ent. Res.* **22**: 35, pl. v, f. 7 (♀); 1935, *Bull. ent. Res.* **26**: 327; 1948, *Bol. Ent. venez.* **7**: 33; 1949, *Rev. Ent., Rio de J.* **20**: 548, f. 3 (map); 1951, *Bull. ent. Res.* **42**: 384.

Diatraea sacchari (Sepp) Kaye and Lamont, 1927, *Mem. Dep. Agric. Trin. Tob.* **3**: 129.

Distribution: Martinique, St. Lucia, St. Vincent, Grenada, Tobago, Trinidad, Venezuela, British Guiana, Netherlands Guiana, French Guiana. The writer has long suspected the presence of this species in Martinique, but until the visit by Dr. F. J. Simmonds in January, 1953, there were no positive records. The larva, a well-known pest of sugar-cane, is called "the yellow-headed borer" in Trinidad and British Guiana.

In 1949 (loc. cit.) the writer gave an account of the early history of this insect, but since then he has been privileged to study the matter in rather

more detail, through courtesies extended by the Netherlands Entomological Society at Amsterdam. Indeed, it was through the personal kindness of Dr. A. Reyne, prominent member of that Society, and his very considerable knowledge of the literature relating to the entomology of Netherlands Guiana (Surinam), that the writer was able to discover Möschler's hitherto forgotten description and coloured figure of *Chilo centrellus*,[1] which left little doubt of its identity with the moth known since 1895 as *Diatraea canella* Hmps. Mr. W. H. T. Tams was consulted at the British Museum (Natural History), and also Dr. Hans Sachtleben, Director of the Deutsches Entomologisches Institut, Berlin, who kindly compared two males of *D. canella* (reared in Venezuela) with Möschler's description and figure of *C. centrellus*, and allows it to be stated that his opinion agrees with Mr. Tams' and the writer's that it is one and the same species of moth. The male illustrated by Möschler is somewhat smaller than specimens commonly reared from sugar-cane, but corresponds with examples bred from larvae inhabiting the stalks of certain wild grasses, notably *Paspalum virgatum* L. and *Andropogon bicornis* L. When the writer passed through Paramaribo in September, 1951, *en route* from Amsterdam to Caracas, some clumps of *Paspalum virgatum* growing near the airstrip at Zandery Airport were examined and yielded several larvae typical of this species, but unfortunately it was not possible to rear these potential topotypes to the adult stage.

Among the fine exhibits displayed by our hosts at the Ninth International Congress of Entomology were the very beautiful original pictures of insects painted by H. C. Scheller in Surinam during the years 1785 to 1791, each accompanied by notes in Scheller's MS. and bound together with a title-page which reads : *Nattur Systeem Over de Surinamsen Insecten. Dat is Der Rupsen, Spinsels, poppen en de daruyt koomende Capsellen of papillions* Ec. The Plate 66, No. 61, depicts part of a stalk of sugar-cane with a spotted lepidopterous larva in the act of feeding. Two moths—one at rest and one in flight—and a pupa are also shown. Although the caterpillar is wrongly shown as feeding externally on the cane stalk, instead of as a borer inside, the composition of the plate and the details of the moths clearly correspond with the insect later described from the same country by Möschler. Mr. F. C. J. Fischer, Librarian of the Netherlands Entomological Society, has been good enough to send the writer photo-facsimiles of the plate and accompanying MS.,[2] as well as the

[1] The lithographed figures are not coloured in all editions of Möschler's 1883 paper, entitled " Beitrage zur Schmetterlings—Fauna von Surinam, V."

[2] In the old Dutch of the period, the MS. reads as follows :

Plaat 66 *No.* 61

16 *voetige nachtkapel.*

a. *de rups.* b. *de pop.* c. *de zittende en vliegende kapel die daaruit voorkomt. deze rups is in het suikerriet te vinden, meer enkeld in een stok, ze eeten het sappige en weeke merg, haar excrement heeft een witte kleur zoo als het binnenste merg van het suikerriet, en week : de rups gaat op en af de stok en eetende, zoo dat die stervt, aande opening swart wordende en rood dien de rups een gat uitgegeeten heeft, wordt in het riet tot pop, heb haar* 15 *Maart gevonden en den* 20 *veranderde ze tot pop, en den* 2 *April s'nachts kwam de kapel uit dus in* 12 *dagen sit daksgewijs en is mak.*

Mr. Fischer was so kind as to transcribe the above from Scheller's somewhat hard-to-read handwriting.

transcription of the title-page, cited above. These records are of special interest, because they constitute the first reference to a sugar-cane-boring caterpillar on the American continent, and, if the work was executed before 1789, as seems probable from the number of the plate (Scheller's 152 plates were numbered in chronological order), it antedates the record of John Luffman of *An insect, called the Borer* attacking sugar-cane in Antigua.[3]

The Scheller plate was later considerably altered, with the relative position of its components rearranged, and published by J. C. Sepp and Son at Amsterdam in 1848, as coloured Plate 64 of their *Surinamsche Vlinders* . . . (*Papillons de Surinam* . . .), accompanied by an amplified description of the habits of the insect, to which they applied the binomial *Phalaena sacchari*. The synonymic table given above is sufficient to show the further systematic history of this species.

Eodiatraea amnemonella (Dyar) comb. nov.

Diatraea amnemonella Dyar, 1911, *Ent. News* **22** : 203 (Brazil : Castro, Parana) ; Dyar and Heinrich, 1927, *Proc. U.S. nat. Mus.* **71**, no. 2691 : 21, f. 14 (♂), f. 62 (♀) ; Box, 1931, *Bull. ent. Res.* **22** : 35, pl. v, f. 3 (♀) ; 1948, *Bol. Ent. venez.* **7** : 34.

Distribution : Known only from the type locality.

Eodiatraea amazonica (Box) comb. nov.

Diatraea amazonica Box, 1931, *Bull. ent. Res.* **22** : 36, pl. i, f. 1, 2 (♂), pl. iv, f. 4, 5 (♀) (Brazil : Calama, Rio Madeira) ; 1935, *Bull. ent. Res.* **26** : 328 ; 1948, *Bol. Ent. venez.* **7** : 38.

Distribution : Brazil : Rio Amazonas and tributaries. The larva feeds in *Paspalum fasciculatum* Willd.

Eodiatraea rufescens (Box) comb. nov.

Diatraea rufescens Box, 1931, *Bull. ent. Res.* **22** : 37, pl. i, f. 3, 4 (♂), pl. iv, f. 6 (♀) (Bolivia : Buenavista) ; 1948, *Bol. Ent. venez.* **7** : 38.

Distribution : Bolivia.

Until last year this species was known only by the male holotype and a rather damaged female, also from Bolivia, both originally at Tring and now in the British Museum (Natural History), and nothing was known of the biology. As a result of correspondence with Dr. J. Alex. Munro, Entomologist at La Paz, the writer has received specimens of moths reared from larvae boring in sugar-cane in the Santa Cruz region of Bolivia, where the species seems to be a pest of some consequence. The larva closely resembles that of *E. centrella* ; it is parasitised by the Tachinid, *Paratheresia claripalpis* (Wulp).

[3] See the discussion of the early history of *Diatraea saccharalis* (F.) by the present writer (Box, 1948, *Bol. Ent. venez.* **7** : 42–43).

NEW AND LITTLE KNOWN SAMOAN PSYCHODIDAE AND A NEW SPECIES FROM RAROTONGA.

By G. H. Satchell, PhD., F.R.E.S.
(*The Museum, Dunedin, New Zealand.*)

In this paper three new species of Samoan Psychodidae, collected during the summer of 1950–51, are described. I am also including a new species from Rarotonga, Cook Islands, collected the previous year, because it is rather closely related to *Psychoda quadrifilis* Edwards, a Samoan species. I am redescribing *Brunettia biformis* Edwards as the discovery of a closely related species, *B. similis* sp. n., makes it desirable to characterise Edwards's species more precisely.

All Samoan specimens were taken either on the main Island of Upolu, or the small island of Manono. Unless otherwise stated they were collected by myself. The types and paratypes will be deposited in the British Museum.

Psychoda adumbrata sp. n.

A small silvery-white species with three black bars across the wing.

♂. Scanty decumbent white tuft on clypeus, dense erect white tuft between antennae. Antennae 15 segmented, 1·6 times wing width, verticils closed, flagellum snowy-white; scape no longer than wide, basal flagellar segment with neck scarcely longer than bulb, very slightly longer in medial segments; thirteenth (fig. 1A) of normal diameter, fused to diminutive fourteenth, which has only a small amount of vestiture, both bearing a small sensory cone; fifteenth separated by a distinct neck; ascoids three branched, of normal Y shape. Palpi (fig. 1B) short; formula: 1 : 0·9 : 0·9 : 1·6.

Thorax with a white tufted vestiture; no allurement organ present. Wing ovate (fig. 1C), 1·4 mm. long by 0·35 mm. wide; radial fork almost above, very slightly after medial, both before level of tip of Cu; origin of R_{2+3} distinctly after tip of first basal cell which is longer than second; wing vestiture white, apart from black erect tufts arranged to form three transverse fasciae, one at wing base, one just behind medial fork and one at level of tip of M_3; in addition two erect tufts occur subterminally on R_4 and M_1; no erect hairs on R_5, and at base only of M_4. Legs covered with whitish fuscous hairs with a white reflection.

Abdomen with scanty whitish hair. Hypopygium (fig. 1D) with coxites longer than wide, bearing an encircling band, rather than a lateral tuft of hairs; style very characteristically shaped in profile, with a recurved terminal hook; scattered sensory setae present, but no lateral tuft at base. Aedeagus consisting of one straight and one curved pointed piece; cercopod (fig. 1E) swollen at base, 1·5 times as long as ninth tergite, with a single retinaculum.

♀. Similar to ♂. Subgenital plate (fig. 1F) exceedingly small, Y-shaped, with a long cylindrical genital digit bearing two setulae at tip; spermathecae consisting of two small striated capsules of characteristic appearance lying posterior to the remaining portions of the spermathecae. Ovipositor short, three times as long as the Y-shaped portion of the subgenital plate.

Type, allotype, 3 ♂ paratypes. Vailema, Upolu, 9.xi.1950.

This species was swept from thick vegetation bordering a stream on the way up to Vailema.

Psychoda malleopenis sp. n.

♀. Erect tuft of long squamuliferous hairs on face, shorter tuft on vertex; eye bridges separated by width of five facets. Antenna 16 segmented, 1·3 times as long as wing width; scape and pedicil with scaly covering, scape an elongate oval, 1·4 times as long as broad, basal flagellar segments (fig. 2B) with neck equal to bulb, longer than bulb in succeeding segments, until it is 1·5 times as long in medial segments; last three segments diminutive, separated, subspherical; ascoids of usual Y type, but arms rather long; verticils subdivided on segments 4–13 so that each bulb appears to have a short proximal verticil separated by a space from the longer distal verticil (fig. 2A). Palpi with segment 3 rather broad apically; formula: 1 : 1·1 : 1·3 : 1·3.

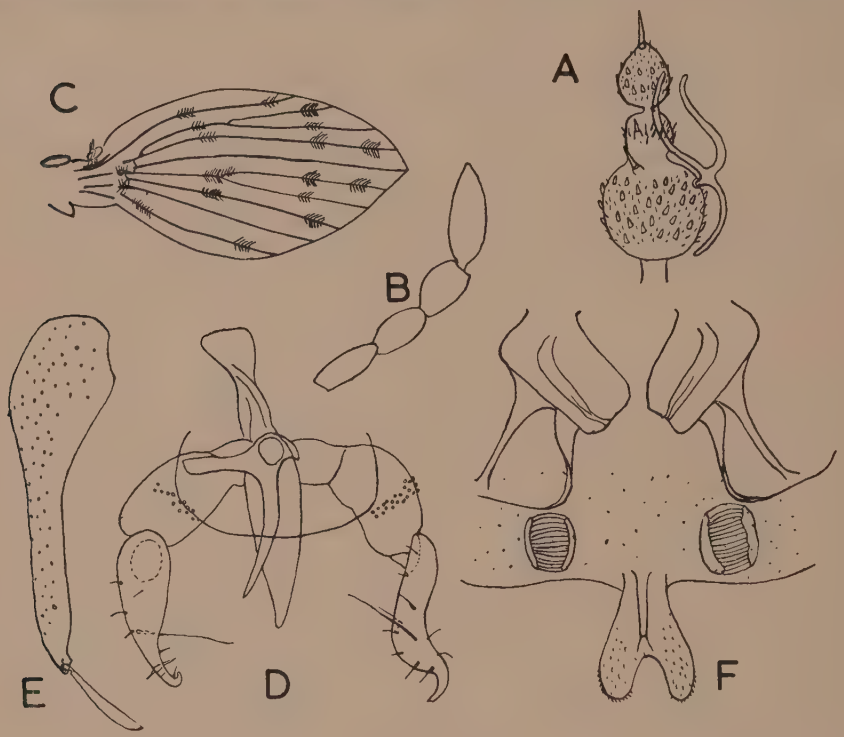


FIG. 1.—*Psychoda adumbrata* sp. n. A. Tip of antenna. B. Palp. C. Venation, showing position of dark tufts. D. Hypopygium. E. Cercopod. F. Subgenital plate and spermathecae.

Thorax covered with vestiture of squamuliferous hairs anteriorly giving way to normal hairs between and behind wings; no allurement organ. Wing (fig. 2C) with a recurved costal flap at base of costa bearing a long almost straight pencil of squamuliferous hairs, similar to, but more extensive than, that in *P. penicillata* Satchell; radial fork before medial, both before tip of Cu; origin of R_{2+3} on R_4 well after apex of first basal cell, which is equal to second; wing membrane infuscated around base of R_5; base of M_{1+2} bent away from base of R_5; approaching close to base of M_3. Wing vestiture with hairs replaced by scales in basal two-fifths of undersurface of wing, elsewhere hairy. Legs unicolorous.

Abdomen with hairy vestiture. Hypopygium with coxite (fig. 2D) subequal to style, style simply curved with a single long seta near the base, a few short setae further round, and some scattered short setae more distally on the inner surface; aedeagus consisting of one straight and one curved piece, the latter with a large sclerotised hemispherical knob at its tip; cercopod (fig. 2E) 1·4 times as long as ninth tergite, not swollen at the base, narrowing evenly in proximal part and then more rapidly two-thirds of the way along; retinaculum single, curved, one-third length of cercopod.

Type and paratype ♂, Malololelei, 2000 ft. Upolu, 18.xi.1950.

The two specimens on which the description is based were swept from low vegetation bordering the farmstead in the clearing at Malololelei. The species is of interest in being the first member of the "penicillata complex" to be found

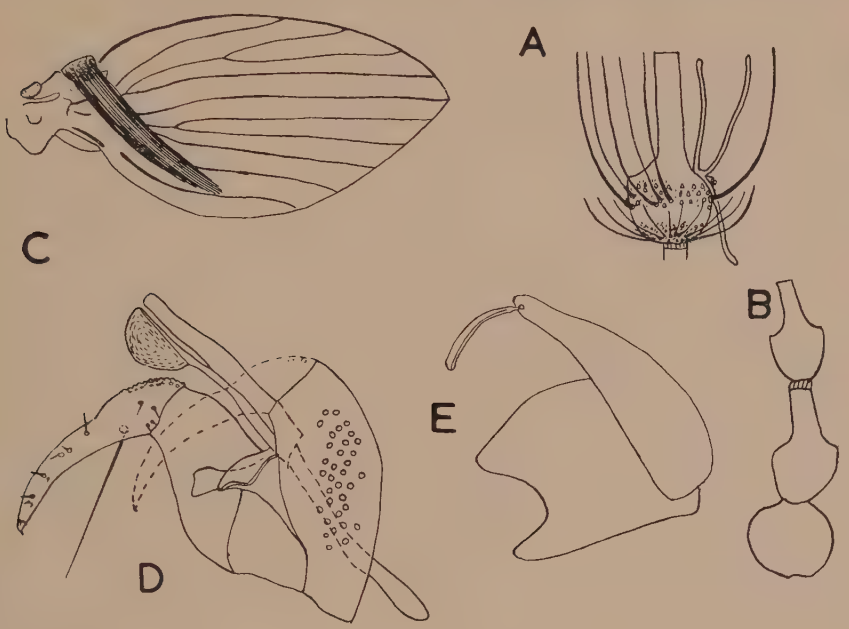


FIG. 2.—*Psychoda malleopenis* sp. n. A. Medial antennal segment. B. Base of antenna. C. Venation and costal tuft (ventral view). D. Hypopygium. E. Cercopod.

in Samoa. *Psychoda penicillata* Sat. (Satchell, 1950*a*) is an Australasian form with a pencil of squamuliferous hairs reflected under the wing. In Australia and New Zealand are a number of species closely related to it, the whole constituting the *penicillata* complex. *P. malleopenis*, in its costal tuft, its scaly underwing, and the shape of its style and cercopods, is a typical member of this complex of species.

Psychoda rarotongensis sp. n.

A uniformly greyish species, related to *P. quadrifilis* Edwards, but having different genitalia in both sexes.

♂. Eye bridges separated by width of half a facet. Antenna 15 segmented, 1·6 times as long as wing width; scape (fig. 3A) 1·1 times as long as wide; basal flagellar segments

with neck equal to bulb, 1·8 times as long as bulb in distal segments ; segment 13 (fig. 3B) with practically no neck, 14 diminutive, almost devoid of hairy covering, 15 oval separated from 14 ; 13 and 14 each with a sensory cone ; ascoids four branched, with one posterior and 3 anterior prongs, paired on segments 3–13. Palpi (fig. 3C) with greyish scaly covering ; palpal formula : 1 : 1·1 : 1·1 : 1·9.

Wing (fig. 3D) 1·25 mm. long ; length (from distal edge of basal-most semichitinous pad to tip) 2·3 times greatest width ; radial fork after medial, both before tip of Cu ; origin of R_{2+3} at apex of first basal cell which is a little longer than second ; and additional semichitinous pad at base of costa bearing a loose cluster of hairs projecting partially under wing

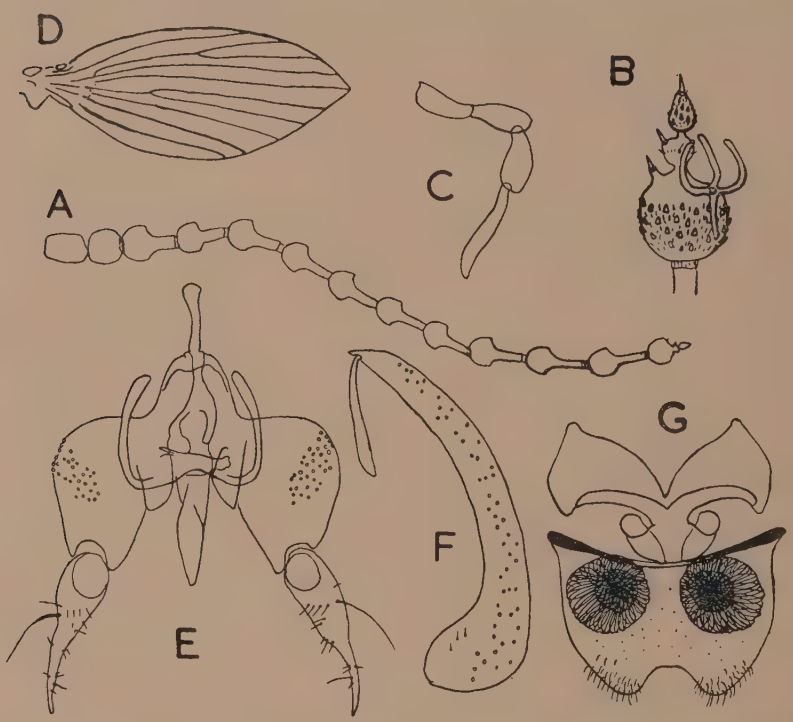


FIG. 3.—*Psychoda rarotongensis* sp. n. A. Antenna. B. Antenna tip. C. Palp. D. Venation. E. Hypopygium. F. Cercopod. G. Subgenital plate and spermathecae.

in the space between base of costa and R_1 ; erect hairs absent on usual veins (R_5, M_2 and M_4), present to tips of others ; vestiture uniformly greyish-brown.

Abdomen with greyish vestiture. Hypopygium (fig. 3E) ; ninth sternite bent inwards medially ; coxite swollen, longer than wide, style about as long as coxite ; tapering to a curved blade-like point from half-way along, bearing scattered sensory setae but lacking all trace of usual lateral tuft of deciduous hairs at base ; aedeagus simple, single, pointed, flanked by a small pointed rod lying closely up against main piece (not well displayed in type) ; cercopod (fig. 3F) just twice as long as ninth tergite, swollen basally, evenly curved, bearing a single retinaculum one third as long as cercopod.

♀. Similar to ♂, but eye bridges more separated, subgenital plate shaped as in fig. 3G ; apparently lacking a genital digit ; spermathecae unusual in having two basal capsules, normally underlying subgenital plate, in which the walls are thickened by radial ridges

so that the whole capsule looks like a ball of wool. Ovipositor twice as long as subgenital plate.

Type, allotype, 1 ♂, 2 ♀ paratypes, Wigmore's Waterfall, Rarotonga, Cook Islands, 26.i.1950.

The specimens were swept from dense bush a few yards below the waterfall. The species resembles the Samoan *P. quadrifilis* (Edwards, 1928) in the four branched ascoids and the conformation of the tip of the antenna. The ♂ genitalia are quite distinct, however, and the Samoan species does not possess the curious spermathecae.

Brunettia biformis Edwards.

Edwards, F. W., 1928, *Insects of Samoa*, **6** : (2) 68.

A large black scaly species with nine white spots on the wing margin, and the ♂ wing broadened.

♂. Bushy erect scaly tufts on clypeus, face and epicranium ; eye bridges 3 facets wide and touching. Antennae 15 segmented, 0·75 of wing width, blackish with campanuliform verticils ; scape (fig. 4A) 1·6 times as long as broad, flagellar segments excentric, basal one with neck much shorter than bulb, neck increasing until it is equal to the bulb in segment 12 ; terminal segment (fig. 4B) with an apiculus swollen at the tip ; ascoids paired rods arising close together on the swollen side of the bulb on segments 3–15, and curving through almost a complete circle. Palpi scaly, formula : 1 : 1·3 : 0·7 : 0·7.

Thorax with a dense covering of black squamuliferous hairs anteriorly and of long ordinary hairs posteriorly ; anepisternite protuberant and covered with minute pores, covered with a thick vestiture of short black scales. Wing (fig. 4C) very broad, wing tip just below R_5, all veins very straight and radiating to margin ; stem of R_{2+3} only one-quarter of R_2 ; radial fork before medial, both near base of wing ; wing membrane between base of R_1 and radial fork sclerotised and slightly intucked to form a shallow pocket lined with particularly dense scales, the whole constituting a scent organ. Wing vestiture black, apart from small white tufts at the tips of R_1–R_5 and M_1–M_4, making 9 in all, wing membrane and veins covered with densely imbricated scales on basal four-fifths of dorsal surface and almost all of ventral surface ; scales of dorsal surface replaced by hairs in distal fifth ; erect hairs present on basal four-fifths of Sc, R_1, R_2 and M_3, and confined to bases of stems of radial and medial forks and Cu ; alula tuft very long and lying close to hind margin of wing. Legs with black scaly covering ; tibia and first 3 tarsal segments of first leg incrassate ; remainder normal.

Abdomen with loose black hairy vestiture. Hypopygium (fig. 4D) with ninth sternite simply curved, coxite quite devoid of hair, style simple, slightly curved, with two setae inserted at the point where the outer edge turns through an angle to run to the tip ; two small setae near tip ; aedeagus simple, bifid, symmetrical, articulating with the lateral parameres ; cercopods equal in length to ninth tergite, bearing a proximal bunch of 12 or so normal spoon-shaped retinacula, and a distal bunch of 14 or so angulated retinacula with racket-like tips.

♀. Eye bridges separated by width of 5 facets. Antennae with necks shorter than in ♂.

Anepisternite not modified. Wing not broadened, 1·7 times as long as wide (fig. 4F) ; white tufts at vein tips more conspicuous than in ♂ ; scales replaced by hairs on dorsal surface of wing ; under-surface uniformly scaly ; erect hairs present on all wing veins in basal two fifths of wing ; tibiae and first tarsal segment narrowly whitish in certain lights.

Subgenital plate as in fig. 4G with paired lobes not meeting in the midline ; spermathecae of type characteristic of genus, with a small amount of reticulation on the capsules. Ovipositor 1·9 times as long as subgenital plate.

26 ♂, 25 ♀ from various localities in Upolu and Manono, Samoa, xi–xii, 1950 ; also from Suva, Fiji, 29.ii.1950 (*B. J. Marples*).

This is the most common species of Psychodidae in Samoa and the ♂s and ♀s may frequently be seen on the surface of leaves in the sunshine, in the luxuriant rain forest covering the lower slopes of the mountains. They are often seen performing their short circular runs around each other, a mating dance that may be, but is more often not, followed by copulation. Edwards (1928)

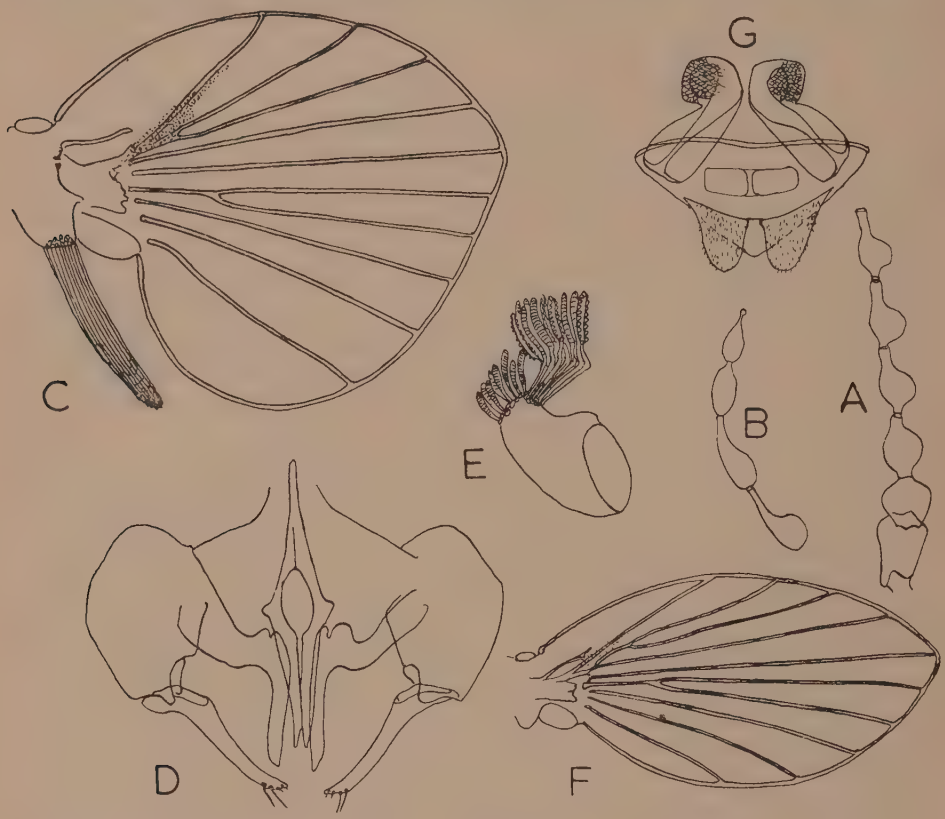


Fig. 4.—*Brunettia biformis* Edwards. A. Base of, B. tip of antenna. C. ♂ wing. D. Hypopygium. E. Cercopod. F. ♀ Wing. G. Subgenital plate and spermathecae.

tentatively associated the ♂ and ♀ of this species as he had bred them out together. I have collected a pair in copulation, verifying Edwards's assumption.

From the specimens I selected some ♂s to dissect and mount on slides. After they had been so mounted I noticed that one was of a distinctly different species, *B. similis* sp. n. I am unable to give any details of the coloration of this new species, for colours are not visible in dissected specimens, but I am fairly certain that the arrangement of white markings will be found to be similar to that of *B. biformis*. Were it markedly different I would have noticed it before the specimen was dissected.

Brunettia similis sp. n.

A black species with broad wings in the ♂, similar to *B. biformis* Edwards, but differing in the shape of the ♂ wing and style.

♀. Decumbent hairy tuft on clypeus, erect scaly tuft on face and vertex. Eye bridges three facets wide, touching in mid-line. Antennae with tips damaged in type; scape and pedicil with scaly covering, verticils campanuliform; scape (fig. 5A) 1·7 times as long as broad, basal flagellar segment with neck much shorter than bulb, medial flagellar segment excentric, with bulb forming two separate bulges (fig. 5B) corresponding each with the inser-

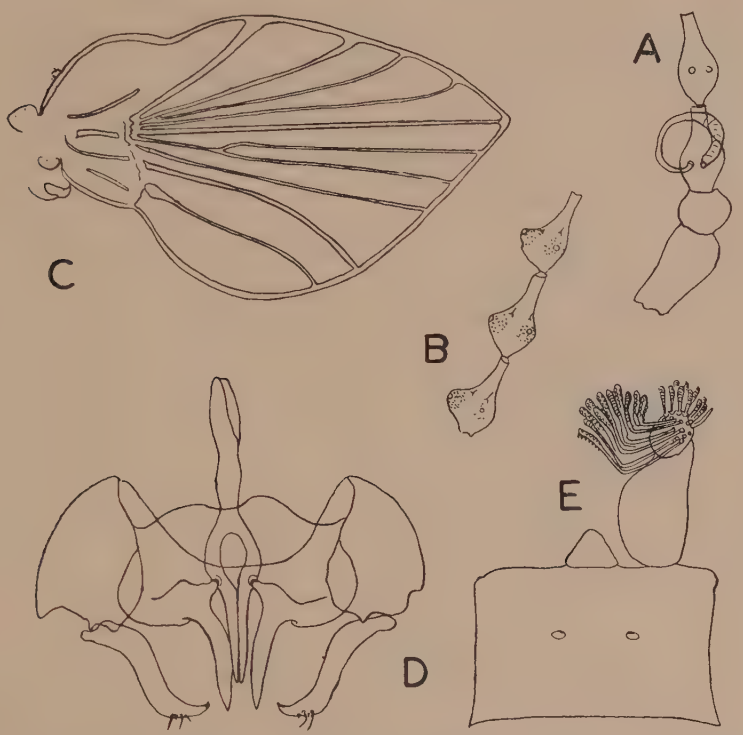


FIG. 5.—*Brunettia similis* sp. n. A. Base of, B. Middle of antenna. C. ♂ Venation. D. Hypopygium. E. Cercopod.

tion of the curved, broad ascoid; neck a little longer than bulb; a minute seta inserted in a pore above base of each ascoid. Palpi with first joint much reduced; formula 1 : 2·9 : 3·1 : 3.

Thorax with anepisternite much as in previous species. Wing (fig. 5c) with R_5 at tip, humeral area broadened giving a distinct hump to the otherwise regular curve of the costal margin; radial fork before medial, very near to base of wing; R_1, R_2, R_5, M_4 and Cu rather thick veins, R_1 and R_2 being particularly diffuse; scales replacing hairs on veins and membrane in basal four-fifths in wing on both surfaces; humeral enlargement heavily scaled; sclerotised area between bases of R_1 and R_2 forming a scent organ as in previous species. Wing markings no longer visible. Tibia and first three tarsal segments incrassate on fore legs, normal on remainder.

Abdomen with hairy vestiture. Hypopygium (fig. 5D) similar to that of *B. biformis*, but style more sharply angulated subterminally, giving it a square-ended appearance.

Type and only specimen, Vailima, Upolu, 16.xi.1950.

In addition to the four Samoan species described here, numerous specimens were taken of *P. makati* Del Rosario (Del Rosario, 1936) [= *P. infurcis* Sat. (Satchell, 1950*b*)] a tropicopolitan species already known from Fiji, Rarotonga, Philippines and Australia. Three specimens of *P. cochlearia* Sat. (Satchell, 1950*b*) hitherto known only from Fiji were taken, and Edwards' (1928) species *P. quadrifilis* was represented by 2 ♂, 6 ♀ specimens. The ubiquitous *P. alternata* Say was plentiful on both islands. Material of another two, possibly three, species was also present in the collection, but was too damaged to be described.

Check List of Samoan Psychodidae.

Brunettia Annandale.
B. biformis Edwards, 1928.
B. similis sp. n.
Lepidopsychoda Edwards, 1928.
L. tineiformis Edwards, 1928.
Psychoda Latreille.
P. alternata Say, 1824.
P. quadrifilis Edwards, 1928.
P. savaiiensis Edwards, 1928.
P. makati Del Rosario, 1936.
P. cochlearia Satchell, 1950.
P. nigripennis Brunetti ? 1908 (mentioned by Edwards, 1928).
P. malleopenis sp. n.
P. adumbrata sp. n.

Summary.

The new Samoan species *Brunettia similis* sp. n., *Psychoda adumbrata* sp. n., *P. malleopenis* sp. n. are described and a new description is given of *Brunettia biformis* Edwards, 1928. The new species *P. rarotongensis* sp. n. from Rarotonga, Cook Islands, is described. A check list of ten species of Samoan Psychodidae is included.

References.

Del Rosario, F., 1936, *Philipp. J. Sci.* **59** : 553–571.
Edwards, F. W., 1928, *Insects of Samoa.* **6.** *Diptera*, Fasc. 2 : 68–75. British Museum (Natural History).
Satchell, G. H., 1950*a*, *Trans. R. ent. Soc. Lond.* **101** : 147–178.
——, 1950*b*, *Proc. R. ent. Soc. Lond.* (B) **19** : 176–185.

NOTES ON THE FAMILY GOMPHIDAE WITH DESCRIPTIONS OF A NEW SPECIES AND THE FEMALE OF ANOTHER (ORDER ODONATA).

By Lt.-Col. F. C. Fraser, I.M.S. (retd.), F.R.E.S.

This paper deals with a number of genera and species belonging to the cosmopolitan family Gomphidae, a family which has been regarded hitherto as archaic, but which I now regard as more recent than the Aeshnidae on account of the loss of the archaic functional ovipositor, this organ still being retained by the Aeshnidae. The first genus discussed, *Temnogomphus* Laidlaw, was merged in *Anisogomphus* Selys but, in the light of more material which has since come to hand, I am now of opinion that it should be restored, with *Temnogomphus bivittatus* (Selys) as the type species. A new species of *Gomphidia* from Coorg, which had been confused with *G. kodaguensis* Fraser for a long time, is here described. The differential points between *Merogomphus longistigma* (Fraser) and *M. tamaracherriensis* Fraser are discussed and figures of the anal appendages contrasted. Lastly, two very rare and interesting Gomphines from Madagascar are discussed, one being a fourth specimen of *Isomma hieroglyphicum* Selys and the other *Onychogomphus aequistylus* Selys, known only from a single male, but here redescribed from a pair sent to me by Dr. R. Paulian of the Institut de Recherche Scientifique, Tananarive, Madagascar, to whom I am greatly indebted for the loan of much rich material.

Systematic.

Family Gomphidae.

Subfamily Ictinogomphinae.

Gomphidia platyceps sp. n.

Subfamily Gomphinae.

Temnogomphus Laidlaw.
Merogomphus tamaracherriensis Fraser.
Onychogomphus aequistylus Selys.
Isomma hieroglyphicum Selys.

Gomphidia platyceps sp. n. (figs. *n* and *o*).

Male.—Abdomen (with appendages) 54 mm. Hind wing 40 mm. Head: Labium bright chrome yellow, labrum, bases of mandibles, clypeus and frons anteriorly bright greenish yellow, becoming more definitely green on dorsum of latter. A narrow transverse black stripe traversing the lower border of frons anteriorly, this being the only black marking on the face (contrasting strongly in this respect with *kodaguensis*, which is extensively marked). Vertex black, frons without marking above, occiput bright chrome yellow changing to dark ferruginous outwardly; behind head black except for posterior aspect of occiput. *The two robust horns on vertex*, common to all species of *Gomphidia*, *entirely absent* and replaced by a flattened semicircular ridge (fig. 1, *n*, *o*.). Prothorax entirely

black; thorax black marked with bright pale green (becoming yellowish after death), a short but deep interrupted mesothoracic collar widely separated from short oblique wedge-shaped antehumeral spots, divaricate anteriorly; a small upper humeral point; laterally two broad stripes, the anterior the narrower, the posterior covering nearly the whole of the metepimeron; between these two stripes an upper and a lower larger spot of green. Legs black, inner sides of anterior femora and spots on trochanters and coxae greenish yellow. Wings palely enfumed brownish posterior to a line from the inner end of pterostigma to the tornus; pterostigma black, covering 5–6 cells. Nodal index $\frac{11\text{–}18 \mid 18\text{–}13}{11\text{–}13 \mid 12\text{–}13}$; Cuqs $\frac{3\text{–}2}{3\text{–}3}$; all Hts crossed once, discoidal cells 3-celled; St entire in right fore wing, 2-celled in the left; anal-triangle 5-celled; 5 rows of cells in anal field of hind wing; membrane white changing to brown at base. Abdomen black marked with citron yellow—segment I with a narrow apical line each side, 2 with a middorsal spot not quite extending to apex, and a large and a small point on each side, the former including the oreillets. Segments 3–6 with baso-dorsal wedge-shaped spots which decrease in size posteriorly, covering one third of segment 3 but barely one-fifth of 6; segment 7 with its basal half yellow, this colour prolonged slightly along the middorsal crest but more extensively so on each side; segment 8 with a basal ring covering one-third of its dorsum; segment 9 with only a vestige of this basal ring, and 10 with a small middorsal spot flanked by small yellow points apically. Anal appendages black, of the same shape as those of *G. kodaguensis*, the inferior very small, sinuous, and about one-third the length of superiors. Segments 8 to 10 have a small bifid point terminating the apical end of the middorsal carina as in other oriental species of the genus.

HINDUSTAN: Coorg, Bhagmandala, 17.vi.24 (*F. C. Fraser*). This new species is closely similar in appearance to *kodaguensis* and I had actually confused it with that species for several years. The unmarked face finally disclosed it, and this will serve to distinguish it readily from that species, as also will the total absence of the two horns on the vertex. The type will be deposited in the British Museum (Natural History). (As I have given away a great number of specimens of *Gomphidia kodaguensis* to various institutions and collectors in the past, it is quite possible that more specimens of this new species may be concealed under the name of the commoner species.)

Temnogomphus Laidlaw.

The genus *Temnogomphus* was created by Laidlaw to hold the species *Anisogomphus bivittatus* (Selys), distinguished by an incomplete basal antenodal in all wings, which is lacking in *A. occipitalis* (Selys). He included *Anisogomphus orites* Laidlaw in the same genus as *occipitalis* but I find that in all my specimens of *orites* a basal incomplete antenodal is present in all wings, so that this species also should go into *Temnogomphus*. Laidlaw also pointed out that the cubital cross-vein in the fore wings of *occipitalis* is duplicated, but not so in *bivittatus* and *orites*. As he was not sure of the constancy of this feature in the species, and more especially in *occipitalis*, he did not include it as a generic character for *Anisogomphus*, but I find that in my moderately large series of *occipitalis* it is invariably present, whereas it is only present in a single female of *orites* and a single female of *caudalis* Fraser. Ignoring these two latter as aberrations, it seems clear that the character should be added to those for *Anisogomphus*. In this latter genus *occipitalis* and *caudalis* are included, whilst *orites* and *bivittatus* come under *Temnogomphus*, the two

former having no basal incomplete antenodal but a duplicated Cuq, whilst the two latter possess the basal antenodal but only a single Cuq. The four species are exceedingly alike in colour, markings and size, as well as in the shape of the male anal appendages, differing most strongly in the formation of the penes, all of which are grossly dissimilar. My suppression of *Temnogomphus* was evidently based on wrong premises, and I now restore it on the evidence afforded by more material.

Merogomphus tamaracherriensis Fraser.

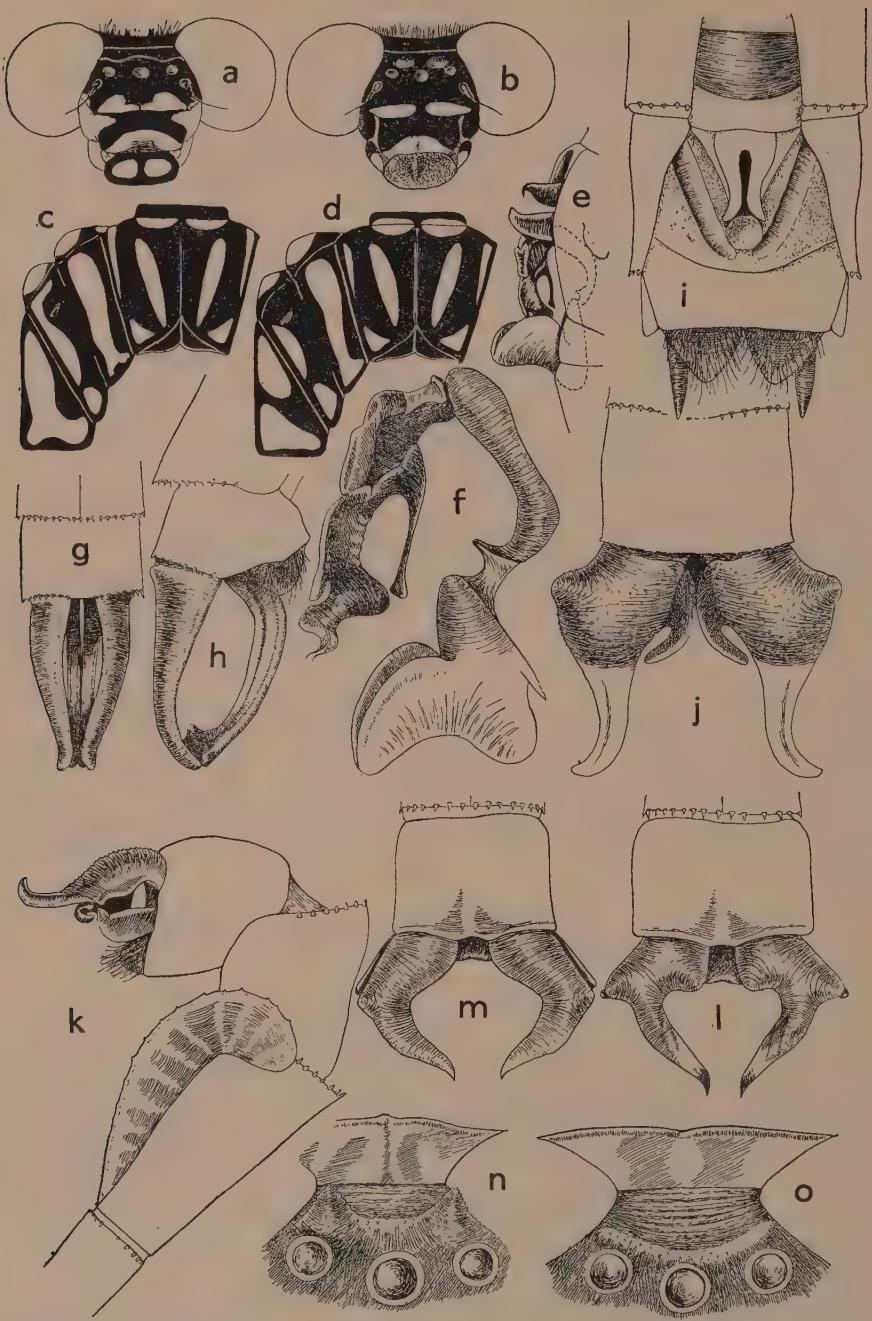
Merogomphus longistigma tamaracherriensis Fraser, 1931, *Rec. Indian Mus.* **33** : 460; 1934, *Fauna Brit. India* (Odonata), **2** : 313.

A specimen of this insect was found in Tinnevelly, S. India, by Mr. Henry of the Colombo Museum and presented to the British Museum. Mr. D. E. Kimmins showed it to me as a new species, but I was able to point out that it agreed with my subspecies *tamaracherriensis* from South Malabar, where I had found it tolerably plentiful some 20 odd miles from Calicut. Mr. Kimmins has pointed out that the anal appendages differ rather widely from those of *M. longistigma* Fraser, so that *tamaracherriensis* should hold specific rather than subspecific rank. I have figured its anal appendages here for the first time: those of *longistigma* are decidedly depressed for the distal half and the apices turn sharply upwards: the inner basal protuberance is bulky and tumid, whilst the outer spine of the superior appendage is much stouter and more prominent: finally the fenestra enclosed by the two appendages is quite cordate. In *tamaracherriensis* the base slopes sharply away on the inner side so that the fenestra is diamond-shaped, the outer spine is shorter, smaller and less conspicuous, whilst the terminal branches are cylindrical, with the apices in the same plane. It is decidedly smaller than *longistigma*, and there are differences in the colour pattern which have already been described in the original description.

Onychogomphus aequistylus Selys (figs. *a*, *c*, *e*, *f*, *g* and *i*).

Onychogomphus aequistylus Selys, 1892, *Ann. Soc. ent. Belg.* **36** : 88; 1898, *ibid.* **42** : 333.

Onychogomphus aequistylus Selys was described from a single male specimen taken at Mayenga in the Rumena Valley, Madagascar. The Selysian description is good but not quite complete as no mention is made of the genitalia and, by an obvious error of omission, no description is given of the colour and markings of the sides of the thorax. Later, in 1898, under the description of *Isomma hieroglyphicum* Selys, the author commented on the striking resemblance of the markings of this species to *O. aequistylus*, so that it may be inferred that the thoracic markings were more or less identical in the two species. This is, in fact, so, as, after a lapse of sixty years, two more specimens have been discovered, one being the hitherto unknown female; I am therefore able to describe the latter and complete the description of the male. Dr. Ris, in a note in his unpublished catalogue of the world's Odonata, is in doubt as to whether the anal appendages of *aequistylus* are typical of *Onychogomphus* (*costae* Selys as exemplified by him) or of *Mesogomphus* (now *Paragomphus* Cowley), so that apparently the Selysian description was not really clear to



a, Head of *Onychogomphus aequistylus* Selys, female, contrasted with *b*, that of *Isomma hieroglyphicum* Selys. Markings of thorax (diagrammatic) of *c*, *O. aequistylus* and *d*, *I. hieroglyphicum*. *e*, Male genitalia of *O. aequistylus*, seen in profile. *f*, Penile organ of same species. *g* and *h*, Anal appendages of *O. aequistylus*, male, seen from the dorsum and right side. *i*, Terminal segments of abdomen of the same species,

him. Nevertheless Selys stated definitely, and in italics, that the superior and inferior anal appendages were of the same length, so that they cannot possibly agree with those of typical *Paragomphus*, in which the inferior appendage is very much shorter than the superiors. The male before me agrees well with the Selysian description.

Male.—Abdomen 38 mm. (40 mm. in type). Hind wing 30 mm. Head similar to type save that the median black of the labrum fails to meet that on the anterior border, so that the two yellow spots are replaced by a horse-shoe-shaped spot. Prothorax black, the anterior lobe, a large spot on each side of the median lobe, a small geminate spot on the middorsum of same and a larger spot on the middle of the posterior lobe greenish yellow. Pterothorax black marked with citron yellow as follows: a slightly interrupted mesothoracic collar, oblique antehumeral stripes pointed below, obtuse above and falling well short of the mesothoracic collar and the ante-alar sinus; an upper triangular spot and a short narrow stripe on the lower part of the dorsum represent an interrupted humeral stripe. Laterally three very irregular stripes, an anterior constricted in its upper third, a median broken up into an upper spot and a lower short stripe, and finally, a broad stripe covering the greater part of the metepimeron. The whole of the underside of thorax, coxae and trochanters yellow. Wings hyaline, tinted with yellow in the subcostal and cubital spaces to as far as the first antenodal and the cubital cross-vein; nodal index $\frac{11\text{–}15 \mid 14\text{–}10}{11\text{–}11 \mid 11\text{–}12}$; pterostigma 3·5 mm., covering 3½ to 5 cells (6 in the type). Abdomen black from segment 1 to 7, ferruginous thereafter including the anal appendages. Segment 1 with its sides and a dorsal spot of yellow, 2 with a middorsal yellow stripe and an irregular one on the sides which includes the oreillets; segments 3 to 6 with the dorsal crest very narrowly yellow and large latero-basal spots; segment 7 with rather more than its basal half yellow; dorsal surfaces of segments 8 and 9 and the extreme base of 10 suffused with black. Genitalia and penile organ (figs. *e* and *f*) closely similar to those of *Onychogomphus schmidti* Fraser except that the apex of the penis has two short flagella as in genus *Gomphus*.

Female.—Abdomen 40 mm. Hind wing 32 mm.

Colouring and markings very similar to those of the male. The labrum with two yellow spots as in the type male; the black on frons more extensive, a fine black line running from the middle of crest meets the black on epistome. Occiput black, but with a large greenish-yellow spot posteriorly; its crest shallowly concave and presenting on each side of the middle line a large bifid spine followed outwardly by two or three smaller spines. The whole of segments 9 and 10 ferruginous, the anal appendages of the same colour, conical and longer than segment 10. The basal yellow streaks on the wings more pronounced; pterostigma longer and thicker, 4·5 mm., braced, covering 5 cells. Nodal index $\frac{11\text{–}15 \mid 16\text{–}12}{11\text{–}10 \mid 10\text{–}13}$.

MADAGASCAR: Ankarafantsika, 11.i.50. This species by its genitalia, equally elongate anal appendages and its venation is an undoubted *Onychogomphus*, perhaps most nearly allied to the African *O. supinus* Hagen and *nigrescens* Pinhey, but distinguished by its less specialised inferior anal appendage.

---

female, ventral aspect to show genitalia. *j* and *k*, Anal appendages of *I. hieroglyphicum*, male, seen from the dorsum and right side. *m*, Anal appendages of *Merogomphus tamaracherriensis* Fraser, dorsal view. *l*, The same of *Merogomphus longistigma* (Fraser). *n* and *o*, Vertex and occiput of *Gomphidia kodaguensis* Fraser and *Gomphidia platyceps* sp. n.

Isomma hieroglyphicum Selys (figs. *b*, *d*, *j* and *k*).

Isomma hieroglyphicum Selys, 1892, *Ann. Soc. ent. Belg.* **36** : 105 ; 1898, *ibid.* **42** : 334 ; Fraser, 1946, *Proc. R. ent. Soc. Lond.* (B) **15** : 155.

The genus *Isomma* was included originally by Selys in the subfamily Ictinogomphinae (= Legion *Lindenia* Selys) on account of the discoidal triangles of the type (a female) being divided by cross-veins. Subsequently, the discovery of a second specimen (a male) indicated that some of the discoidal triangles at least might be entire and so Selys transferred his genus to the subfamily Gomphinae. A third specimen (a male), which was described by myself in these *Proceedings*, also showed that some of the discoidal cells might be entire and the subtrigones entirely so. Now a fourth specimen (a male) lies before me in which *the whole of the triangles are entire*, so that there no longer remains any doubt as to the position which *Isomma* holds in the family Gomphidae. Moreover, as I have shown, the presence of a single cross-vein between the sectors of the arculus in the hind wings places the genus without any doubt in the subfamily Gomphinae. From the close resemblance of the genitalia and penis to the group *Onychogomphus* + *Paragomphus* it is possible to place its position even closer and to be confident that, like all other Madagascar gomphines, it is a derivative from that group, although, from the high specialisation which it has attained, it is evident that it has been isolated over a vast space of time.

The new specimen comes from MADAGASCAR : Antakotako, v.49, and shows a greater melanism and more open venation than the other three known specimens. This, with some slight variation in the anal appendages and the different habitat (Antakotako is on the north-east coast some 160 miles plane-flight from Nossi-Bé), may indicate racial differences.

Abdomen with appendages 45 mm., hind-wing 35 mm. Labium and face reddish brown, the anteclypeus rather paler ; frons and vertex blackish brown, the former with two oval elongate greenish yellow spots on the upper surface of crest ; thorax with the black preponderating on the sides as much as on the dorsum, marked with citron yellow as follows : a broad anterior stripe constricted above, a median stripe broken up into a large triangular spot above and a lunar-shaped median spot bordering the postero-lateral suture anteriorly ; lastly two very large spots on the metepimeron separated by a broad black stripe. (In the Tamatave male described by me, the yellow areas on the side are all confluent and the black much restricted, although this is certainly not due to tenerality). Abdomen black marked with citron yellow but the latter more restricted than in the Tamatave male, latero-basal paired spots and paired jugal dorsal spots on segments 3 to 5, segment 6 similar but without the jugal spots, segment 7 with its basal half yellow, remaining segments bright ferruginous. Venation of wings more open, all discoidal cells, subtrigones and hypertrigones entire, anal triangle 4-celled in right hind wing, 3-celled in the left ; 2 cubital cross-veins in all wings ; nodal index $\frac{12\text{–}16 \mid 16\text{–}12}{13\text{–}12 \mid 12\text{–}13}$; the pterostigma black, covering only 3 to 4 cells, strongly braced. Abdominal segment 8 with well-developed lateral foliations but no evidence of such on segment 9. Anal appendages (fig. *j*, *k*) black save for the depressed strongly curved bright yellow apical spine of superiors. Penis figured in *Trans. R. ent. Soc. Lond.* **90** ; Pl. 5, fig. 9.

BRITISH DIPTERA ASSOCIATED WITH FUNGI. 1. GALL MIDGES (CECIDOMYIDAE) REARED FROM THE LARGER FUNGI.

By Professor P. A. Buxton, C.M.G., F.R.S., F.R.E.S.

(*London School of Hygiene and Tropical Medicine.*)

and

H. F. Barnes, M.A., Ph.D.

(*Rothamsted Experimental Station.*)

In 1936 the available information regarding the gall midges whose larvae feed on or are associated with fungi (not only in Britain) was co-ordinated by Miss Joan A. T. Anderson (1936). Of the 28 described species and numerous others, only eight came from the larger fungi among the Basidiomycetes ; the remainder were associated with the other group (the rusts) of the Basidiomycetes, or else with the Ascomycetes (mildew, moulds, etc.), the Phycomycetes, and many unidentified fungi.

The gall midges then known from the larger fungi were tabulated by Anderson as follows :

(*a*) Identified Fungi.

Fungus.		Midge.	Country.
Polyporaceae	*Polyporus confluens* Fr.	*Camptodiplosis boleti* Kieffer	Lorraine.
,,	*Polyporus confluens* Fr.	*Mycetodiplosis boleti* Kieffer	Lorraine.
,,	*Poria vaillanti* Fr.	*Mycodiplosis poriae* Rübsaamen	Germany.
Agaricaceae	*Cultivated mushroom	*Mycophila speyeri* Barnes	England.
,,	*Cultivated mushroom	*Miastor* sp.	England.
,,	*Mushrooms	*Mycophila fungicola* Felt	U.S.A.

(*b*) Unidentified Fungi.

Fungus.	Midge.	Country.
*Mushroom	*Pezomyia brachyptera* Kieffer	Algiers.
Polyporus spp. (?)	*Coprodiplosis polypori* Winnertz	Germany.

* Cultivated mushrooms are best assigned to *Psalliota hortensis* (Cooke) W. G. Smith ; *Agaricus bisporus* (Lange) Singer is a synonym. " Mushrooms " if not cultivated can only be referred to as *Psalliota* sp. (or *Agaricus* sp.).

It will be seen that only two gall midges were known from Britain and both were associated with cultivated mushrooms. Since the publication of Anderson's paper three additional species have been reared from cultivated mushrooms in England, namely *Mycophila barnesi* Edwards, *Pezomyia vanderwulpi* de Meijere and *Lestremia cinerea* Macquart. There is no need to give further details concerning the gall midges of mushrooms as they have recently received attention (Barnes, 1946).

We note that Edwards (1925), in describing *Trichonta stereana*, bred from larvae on the fungus *Stereum hirsutum*, observed that some of the " larvae were apparently attacked by a small red Cecidomyid larva."

In the last two-and-a-half years one of us (P. A. B.) has examined several hundred collections of the larger fungi (mostly Agaricaceae and Polyporaceae) in an attempt to study the Diptera which breed in them. Surprisingly few Cecidomyidae have been bred.

The interesting species, described below as *Camptodiplosis auriculariae*, was obtained from a common fungus, *Auricularia auricula-judae*.[1] The sporophores of *A. auricula-judae* are easily found on dead branches of elder (Common Elder, *Sambucus nigra* L.). They also occur on dead wood of other species. In the thicket in which most of our material was collected, the fungus is common on elder and occasional on dead elm (*Ulmus* sp.). The sporophores occur throughout the year : the mycelium in the dead wood is probably perennial.

This genus *Auricularia* is one of the Hymenomycetes, Heterobasidieae. The only other common member of this genus in Britain is *A. mesenterica*. But we have failed to breed any Cecidomyids from nine samples of this latter fungus collected during seven different months from April to December at Gerrards Cross, Bucks. This absence is interesting, for our material has come from the same thicket in which the midge was collected in *A. auricula-judae*. Dr. Dennis calls attention to the fact that " *Auricularia* falls into two sections often treated in the past as two genera ; viz. *Hirneola* with *auricula-judae*, and *Auricularia* proper, with *mesenterica*." The Mycetophilid flies recorded from the two fungi are different (below).

A few other fungi (*Calocera* and *Dacrymyces*), which also belong to the Heterobasidieae but not to the same family, have been investigated, but no gall midges have been encountered.

When the larvae of *C. auriculariae* are present, they can easily be seen in the translucent tissue between the two surfaces of the sporophore, particularly when held up to the light. Several larvae are to be found scattered throughout a single fungus. Living larvae were exhibited on 7th November, 1951, at a meeting of the Royal Entomological Society of London (1952, *Proc. R. ent. Soc. Lond.* (C), **16** : 65). If one collects the sporophore in the autumn when the larvae are full-grown they soon start coming out and will quickly scatter by " jumping " about in the manner characteristic of other gall midge larvae, such as *Contarinia* species. In fact, both in behaviour and size, they are highly reminiscent of Pear Midge larvae " jumping " out of blasted pear fruitlets. They have, however, a striking pink colour. The midges also are about the same size as *C. pyrivora*. However, they can easily be recognised as members of the Trifila group of the Cecidomyiariae by the three circumfila on each male flagellar antennal segment.

More detailed consideration indicates that these midges should be included in the genus *Camptodiplosis* Kieffer (1912, *Marcellia*, **11** : 232) in spite of all the claws being bifid. This genus was erected for *Mycodiplosis boleti* Kieffer on account of the fact that, unlike other *Mycodiplosis* species, the two circumfila on the female's flagellar antennal segments are not applied as in *Dasyneura* but with distinct very short loops. The larvae of *C. boleti*, also unlike those of other *Mycodiplosis* species, have the habit of " jumping " or projecting themselves into the air. They were found embedded in the milk sap exuded

[1] Dr. R. W. G. Dennis of the Royal Botanic Gardens, Kew, has advised us in mycology. He says that strict application of the laws of nomenclature may result in changing this familiar name to *Auricularia auricula* (L. ex Hooker) Underw.

on the upper surface of *Polyporu sconfluens* by Kieffer, who stated that the females oviposit on both surfaces of the fungus : the fungus is widespread but uncommon, and not recorded from Britain. Only the female of *C. boleti* was described, the male being unknown.

It seems prudent to describe the midge we found on *Auricularia auricula-judae* as a new species.

Camptodiplosis auriculariae sp. n.

Male.—Length about 3 mm. Antennae : 2 + 12 ; first and second flagellar segments fused ; each flagellar segment, except the 12th, consisting of a basal subglobular node with a long stem and a distal elongated slightly constricted node with a long neck ; the

Fig. 1.—Sketches of male genitalia (*a–d*) and ovipositor (*e*) of *Camptodiplosis auriculariae* sp. n. *a*, ventral view (omitting dorsal and ventral lamellae) to show tooth-like processes on basal clasp segment and two horn-like processes terminating ventral plate ; *b*, dorsal view (omitting style and ventral plate) to show dorsal and ventral lamellae ; *c*, lateral view of style ; *d*, lateral view to show relative positions of lamellae, proximal swelling of basal clasp segment and style ; and *e*, lateral view of ovipositor, showing one of the lateral lamellae, minute ventral lamella and curious process on last abdominal segment.

basal node bears a ring of long stout setae and one circumfilum whose loops reach nearly to the next node ; the lower portion of the distal node below the constriction is slightly smaller than the basal node and bears a ring of setae and one circumfilum, whose loops are slightly shorter than those on the basal node and extend to the upper portion of the node ; this is about equal in size to the basal node and bears a ring of long stout setae and a second circumfilum whose loops, as long as those on the basal node, extend nearly to the basal node of the next segment ; the loops of the three circumfila are regular ; the stem of the third flagellar segment is about as long or slightly longer than the basal node and about twice as long as broad ; the neck is almost as long as the distal node and about the same width as the stem ; the stem of the 10th flagellar segment is nearly twice as long as

the basal node and about four to five times as long as broad, the neck is slightly longer and about the same width ; the stem of the 12th flagellar segment is nearly twice as long as the basal node, the distal node bears a setose prolongation, swollen proximally, nearly equal in total length to the stem. Palpi : proximal segment quadrate ; second elongate ; third slightly longer and narrower ; distal and fourth segment slightly longer, about the same width ; all setose with a few longer hairs. Wings : covered with macrotrichia, slightly smoky-iridescent ; third vein reaching just about or slightly beyond apex, slightly curved distally ; fifth vein forked, lower branch forming right angle with the stem. Thorax and legs brown. Claws strongly curved, each with a distinct basal tooth. Abdomen fuscous, with long thin hairs. Genitalia (fig. 1*a–d*) : basal clasp segment about twice as long as broad with dorsal rounded proximal swelling bearing two chitinised tooth-like processes on inner ventral surface ; distal clasp segment moderately stout ; dorsal lamella moderately deep U-shaped emargination, each lobe rather squarely rounded, bearing short setae ; lower lamella broadly rounded, entire, setiferous ; style prominently chitinised, opening facing downwards ; ventral plate terminating in two chitinised horn-like processes.

Type : Cecid. 8210 (Barnes Collection).
Paratypes : Cecid. 8196–8209 and 8211–12.
Other specimens : Cecid. 7471–3, 8959–62 and 8965.

Female.—Length about 4 mm. Antennae : first and second flagellar segments fused ; each flagellar segment bottle-shaped, with a distinct neck ; the basal portion of each segment slightly constricted centrally with proximal and distal rings of long stout setae, the distal less regular, and two circumfila with short loops, third flagellar segment about three times as long as wide, neck about one-third the length of the segment and two and a half times to three times as long as wide ; 10th flagellar segment about the same proportions ; 12th flagellar segment longer, tapering, terminating after an almost transverse neck in a setose prolongation, swollen at its base which bears a ring of medium-length stout setae and about one-third the length of the segment excluding the prolongation. Last segment of abdomen with curious lateral process (fig. 1*e*). Ovipositor : not protractile ; lateral lamellae broadly rounded, setiferous, about as long as wide ; very small basal lamella. Otherwise about as in male.

Holotype : Cecid. 8223.
Paratypes : Cecid. 8213–22 and 8224–30.
Other specimens : Cecid. 7474–5 and 8963–4.

Larva.—Full-grown, about 5 mm. in length ; antennae short ; mouthparts strongly haustatory, reminiscent of *Mycodiplosis* ; well-developed bifid breastbone or sternal spatula ; distal segment with five to six slightly chitinised papillae distally, anal lobe rounded, with rows of fine denticulations. In life : pink in colour, " jumping " in habit.

Cecid. 7469–70.
Habitat.—In the sporophores of *Auricularia auricula-judae.*
Type locality : Gerrards Cross, Bucks., England.

The species just described has been bred only from sporophores of the fungus *Auricularia auricula-judae*, gathered from both elder and elm at Gerrards Cross, Bucks. In addition, pink larvae doubtless of this species have been found in the same fungus at Banbury, Oxon. A few examinations of the same fungus on elder in Bedford Park, Bedford, failed to reveal their presence.

The life history of the midge is imperfectly known. One of us (P. A. B.) kept the fungus indoors, over damp sawdust in a tube or beaker, the mouth

closed with gauze. Midges emerged on several occasions from sporophores collected between August and December. About half of our gatherings of this fungus have failed to produce adults or the characteristically pink larvae ; but that failure may have been due to difficulty in rearing them. Apparently the development of the larvae in winter is very slow. From material collected in October pink larvae came out and wandered over the glass from November till February. On the other hand, sporophores collected on 15th September produced midges a month later.

The other author (H. F. B.) received several specimens of the fungus collected at Gerrards Cross early in November, 1951. Some of the pink larvae had already "jumped" out of the fungus and these together with the fungus were placed in the customary gall midge emergence cage. This consists of a lamp-glass, half-filled with damp peat fibre, inserted on the top of a soil-sand mixture in a 5-in. flower pot standing in a saucer ; a muslin-covered iron ring rests on the top of the lamp-glass. This cage was kept in the unheated insectary at Rothamsted Lodge. The remaining larvae came out of the fungus and all buried themselves in the peat. Emergence of the midges commenced on 18th May, 1952, and continued daily until 4th June. By this date 16 males and 22 females had emerged. Apparently the peak of emergence occurred on 24th and 25th May as on these days 5 and 9 midges respectively appeared. Desultory emergences (2 additional males and 3 more females) continued on 7th, 14th, 15th and 21st June ; no emergence took place in July ; and finally one female emerged on 8th August.

It seems clear that *Auricularia* is not the food-plant of any considerable number of species of Diptera. From a total of ten gatherings of *A. auricula-judae* we have twice bred *Helomyza variegata* H. Lw. (Helomyzidae), from rather old or decayed sporophores. The larva of this insect is a very general feeder on fungi. On one occasion larvae of a Nematoceran were observed but adults have not emerged. We note that Edwards (1925) only records breeding one Mycetophilid, *Sciophila hirta*, from *A. auricula-judae*. From *A. mesenterica* he records *Cerotelion lineatus*, *Zygoneura sciarina*, *Mycomyia marginata* and *Docosia gilvipes*.

Among the material which we have examined, other fungi have given rise to a few specimens of gall midges. Each is new to the British list. They have been provisionally identified as follows :

? *Camptodiplosis boleti* Kieffer. A single male (Cecid. 8231 in the Barnes Collection), reared during March, 1952, from *Polyporus giganteus* collected at Gerrards Cross, Bucks. (P. A. B., No. 74*a*). This identification is tentative, since this species was described by Kieffer on females only, caught during September while ovipositing on *Polyporus confluens* (a fungus not on the British list), near Bitsche, Lorraine.

Lestodiplosis (*Coprodiplosis*) *polypori* Winnertz. Two males and one female (Cecid. 7476–8), reared during August, 1951, from *Polyporus squamosus* collected at Gerrards Cross, Bucks. (P. A. B., No. 63). One additional male (Cecid. 8547), reared during July, 1952, from *P. squamosus* collected at Gerrards Cross, Bucks. (P. A. B., No. 22/52). Winnertz described both sexes of this species, whose larvae he found on several species of *Polyporus* on which were living many beetle and Dipterous larvae.

Lestodiplosis (*Coprodiplosis*) sp. One male (Cecid. 7479), reared during

July, 1951, from *Pleurotus cornucopiae* also collected at Gerrards Cross, Bucks. (P. A. B., No. 46*a*).

References.

Anderson, Joan A. T., 1936, Gall midges (Cecidomyidae) whose larvae attack fungi. *J. S.-E. agric. Coll., Wye*, **38** : 95–107.

Barnes, H. F., 1946, *Gall midges of economic importance. Vol.* 1. *Gall midges of root and vegetable crops.* London : Crosby Lockwood & Son.

Edwards, F. W., 1925, British fungus-gnats (Diptera, Mycetophilidae). With a revised generic classification of the family. *Trans. ent. Soc. Lond.* **1924** : 505–670.

Book Notice.

Wat leeft en groeit de wereld van dieren en planten. 19, 20. Mieren II, III. By A. Raignier. 8vo. Utrecht (Spectrum), 1950. Pp. 101 + 136, 8 half-tone figs. in each, text illust. Price hfl. 2.90 (paperbound), hfl. 3.90 (clothbound).

These two volumes continue the story of ant natural history begun in volume I and deal with subjects such as how ants find their way and the sort of tracks they make and follow ; how the work of the colony is shared among the worker caste ; how they stridulate, recognise friend and foe and tend their aphis cows ; one chapter deals with the various guests which live in their nests, and in another, Dr. J. van Boren gives simplified keys, well illustrated with figures, which should enable collectors to name many of their captures with a reasonable accuracy. A bibliography of some twenty titles and a number of alterations and additions to volumes I and II conclude the final volume. Each volume has its own index.

The Ants of California. By Thomas W. Cook. 8vo. Palo Alto, Calif., U.S.A. (Pacific Books), 1953. Pp. xv + 462, text illust. Price $10.00.

This is claimed to be the most complete study made of the ants of California. All species found in the State are named with their range and distribution, ecology, taxonomic status and economic importance.

Sections dealing with Ant Control, pest control literature, a brief list of general works on ants, a technical bibliography and a list of the original repositories of Formicidae types are included.

CHIRONOMIDAE (DIPTERA) FROM WESTERN CAPE PROVINCE—II.

By Paul Freeman, M.Sc., F.R.E.S.
(*British Museum, Natural History.*)

Part I of this series was published earlier in this volume (pp. 127-135), and should be referred to for details of localities, collectors, and terms used.

Orthocladius conicus sp. n.

Entirely black except for halteres; A.R. 1·5; wings with no distinguishable microtrichia, costa produced, anal vein reaching beyond fork, lobe slightly produced; anal point bare and short. In Edwards' (1929) classification it seems to fall fairly well into group D.

Male.—Wing length 1·6–1·75 mm.

Head, antennae and mouthparts black; A.R. about 1·5. *Thorax* quite black with some greyish pruinosity, dorso-central bristles uniserial. *Legs* brownish black, trochanters paler, empodium small, pulvilli absent; L.R. 1·5. *Wings* without distinguishable microtrichia, costa produced for about one-third of distance to M, r–m not particularly transverse; posterior fork distal to cross vein; Cu slightly curved, An reaching well beyond fork; anal lobe distinguishable but rounded and only slightly produced; squama with fringe of about 7 hairs. *Halteres* yellowish white. *Abdomen* black; hypopygium (fig. 4*a*) with anal point short and conical, not so broad in the paratype as in the holotype; basally there is a group of hairs, otherwise both anal point and IXth tergite are bare; coxite with small inner lobe, style without strong inner flange, apical spine normal.

Female not known.

Holotype male and paratype 1 ♂, Berg River, Piquetberg, 9.ix.52.

Pseudorthocladius lobiger sp. n.

Scutal stripes of male more or less fused, of female separate, scutellum yellowish, halteres brownish, last tarsal segment flattened; easily distinguishable from *P. similis* Freeman by the large inner lobe to the coxite.

Male.—Wing length 1·75 mm.

Head.—Face yellowish, vertex black, mouthparts blackish, antennae black; A.R about 0·7. *Thorax* black, scutal stripes practically fused but just indicated by their darker colour; prothorax, shoulders, scutellum, pleural membrane, wing bases, yellowish. *Legs* brown, last tarsal segment dorso-ventrally flattened; empodium and small pulvilli present; L.R. about 0·75. *Wings* without distinguishable microtrichia, venation as in fig. 4*b*; costa slightly produced, posterior fork well beyond cross vein; anal lobe indicated but obtuse, squamal fringe of about 6 hairs. *Halteres* brownish. *Abdomen* dark brown; hypopygium (fig. 4*c*) without anal point, IXth tergite bare, coxite with very large inner free lobe; style simple, with no inner flange.

Female.—Wing length 1·5 mm.

Head brown, scape yellow, last antennal segment equal to preceding two in length; thorax yellow with three separate brown stripes, scutellum yellow, postnotum and sternopleuron blackish; legs, wings and halteres as in male; abdomen brown.

Holotype male and paratype 1 ♀, Berg River, Wellington, 20.v.52; paratypes, 2 ♀, Kirstenbosch, 29.iv.52.

Eudactylocladius productus sp. n.

A black insect without paler markings in the male, female with scutal stripes more or less separated; wings with distinguishable microtrichia, costa strongly produced, r–m very oblique; A.R. about 2, sensory hairs of female antennae simple. This species falls into group B of Edwards' classification of *Orthocladius*: later authors accord it full generic rank, using the name *Eudactylocladius* Thienemann.

Male.—Wing length 1·5 mm.

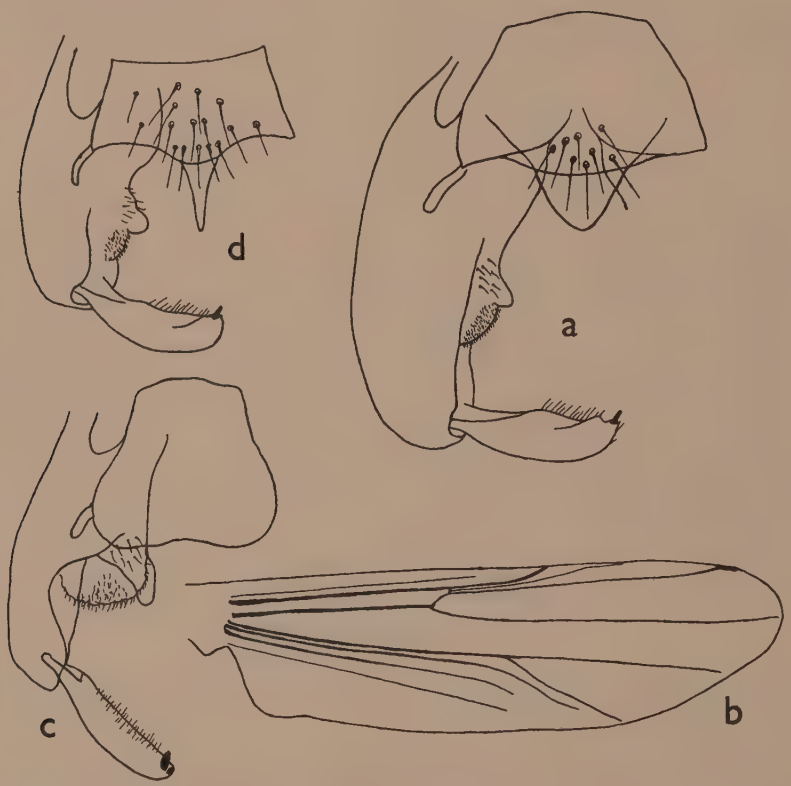


Fig. 4.—Hypopygia and wing of males of Orthocladiinae. (*a*) *Orthocladius conicus*; (*b*) and (*c*) *Pseudorthocladius lobiger*; (*d*) *Eudactylocladius productus*.

Head, antennae and mouthparts black, A.R. about 2. *Thorax* black, pleural membrane brownish, scutum with some pruinosity along the lines of the dorso-central bristles which are uniserial. *Legs* pitchy, empodium distinct, L.R. about 0·7. *Wings* with microtrichia just distinguishable under a magnification of × 200; costa strongly produced, reaching about one-third of distance to M; r–m very oblique, posterior fork distal to r–m, Cu slightly bent. An ending at fork; anal lobe rounded and distinct but not produced; squamal fringe composed of about 4 bristles. *Halteres* dark. *Abdomen* black; hypopygium (fig. 4*d*) with well-formed, bare, anal point; IXth tergite hairy; coxite rather short, with inner lobe; style without inner flange, apical spine simple.

Female.—Wing length 1·2 mm.

Paler than male, head yellowish, thorax yellowish with separated black stripes, scutellum,

postnotum and sternopleuron dark. Sensory hairs of antennae simple, last segment as long as two preceding together.

Holotype male and paratypes 1 ♂, 10 ♀, Berg River, Wellington, 20.v.52.

Eukiefferiella Thienemann.

Eukiefferiella Thienemann, 1926, *Arch. Hydrobiol.* **17** : 325 ; Edwards, 1929, *Trans. ent. Soc. Lond.* **77** : 350 ; Goetghebuer, 1944, *in* Lindner, *Flieg. Pal. Reg.* **3** : 114 ; Brundin, 1947, *Ark. Zool.* **39A** (3) : 31.

Microcricotopus Thienemann and Harnisch, 1932, *Zool. Anz.* **99** : 137.

Akiefferiella Thienemann, 1936, *Stettin. ent. Ztg.* **97** : 43 ; Thienemann, 1936, *Arch. Hydrobiol.* **30** ; 195.

Parakiefferiella Thienemann, 1936, *Stettin. ent. Ztg.* **97** : 43, Thienemann, 1936, *Arch. Hydrobiol.* **30** : 195 ; Brundin, 1947, *Ark. Zool.* **39A**, (3) : 32.

Camptokiefferiella Goetghebuer, 1944, *in* Lindner, *Flieg. Pal. Reg.* **3** : 122 (as subg. of *Eukiefferiella*).

There are four species belonging to this genus in Dr. Scott's material ; three of them can be placed quite easily into the groups *Microcricotopus*, *Eukiefferiella* and *Camptokiefferiella*. The fourth species resembles *Parakiefferiella*, but has a single squamal hair which precludes it from that group and would place it in *Eukiefferiella sens. str.* It does not fit well on other characters into this group, and if the groups were treated as genera, then a new genus would have to be erected for it. As the bulk of the described species fall into *Eukiefferiella sens. str.*, I think that there is little to be gained by splitting off single species as separate genera. I am therefore considering Thienemann's genera to be no more than subgenera and probably only species groups.

Eukiefferiella (Microcricotopus) niveipluma sp. n.

A small insect ; male matt black with white antennal plumes, female more yellowish with separate scutal stripes. Eyes densely pubescent, small pulvilli present, hypopygium with narrow anal point.

Male.—Wing length 1·0–1·3 mm.

Head.—Face brown, vertex black, mouthparts and scape black, flagellum brown, plumes white ; flagellum with 13 segments, last one clubbed and with about 12 long curved hairs on its apical half ; A.R. 0·3–0·4 ; eyes densely hairy. *Thorax* completely black, scutum matt. *Legs* brownish, tarsi rather paler, L.R. 0·6, small pulvilli present. *Wings* milky-white, costa (fig. 5*b*) strongly produced reaching one-third of distance to M ; fork beyond cross vein, Cu almost straight, An reaching beyond fork ; anal lobe absent, squama with two or three hairs. *Halteres* yellowish brown or brown. *Abdomen* black, hairs often whitish, hypopygium as in fig. 5*a* ; anal point narrow and with a few hairs ; IXth tergite with 4–6 hairs across the base of the anal point, coxite with small inner lobe, style as shown, with strongly marked outer apical angle, large blunt spine and no inner flange ; the exact shape of the apical angle varies slightly and also depends on aspect.

Female.—Wing length 0·75–1·3 mm.

Face yellow, vertex brown, antennal segments 3–5 more or less oval, sixth equal to preceding three in length and somewhat clubbed, with a number of long white hairs as in male. Thorax yellowish with three dark scutal stripes which are well separated, scutellum brown, postnotum and sternopleuron blackish ; legs and wings as in male, halteres pale. Abdomen black.

Holotype male, Berg River, Piquetberg, 25.ix.52. Paratypes, all from Berg River : Wellington, 4 ♂, 10 ♀, 20.v–9.vi.52 ; Piquetberg, 9 ♂, 11 ♀, 9.ix–30.x.52 ; French Hoek Forest Reserve, 21 ♀, 29.ix–22.x.52.

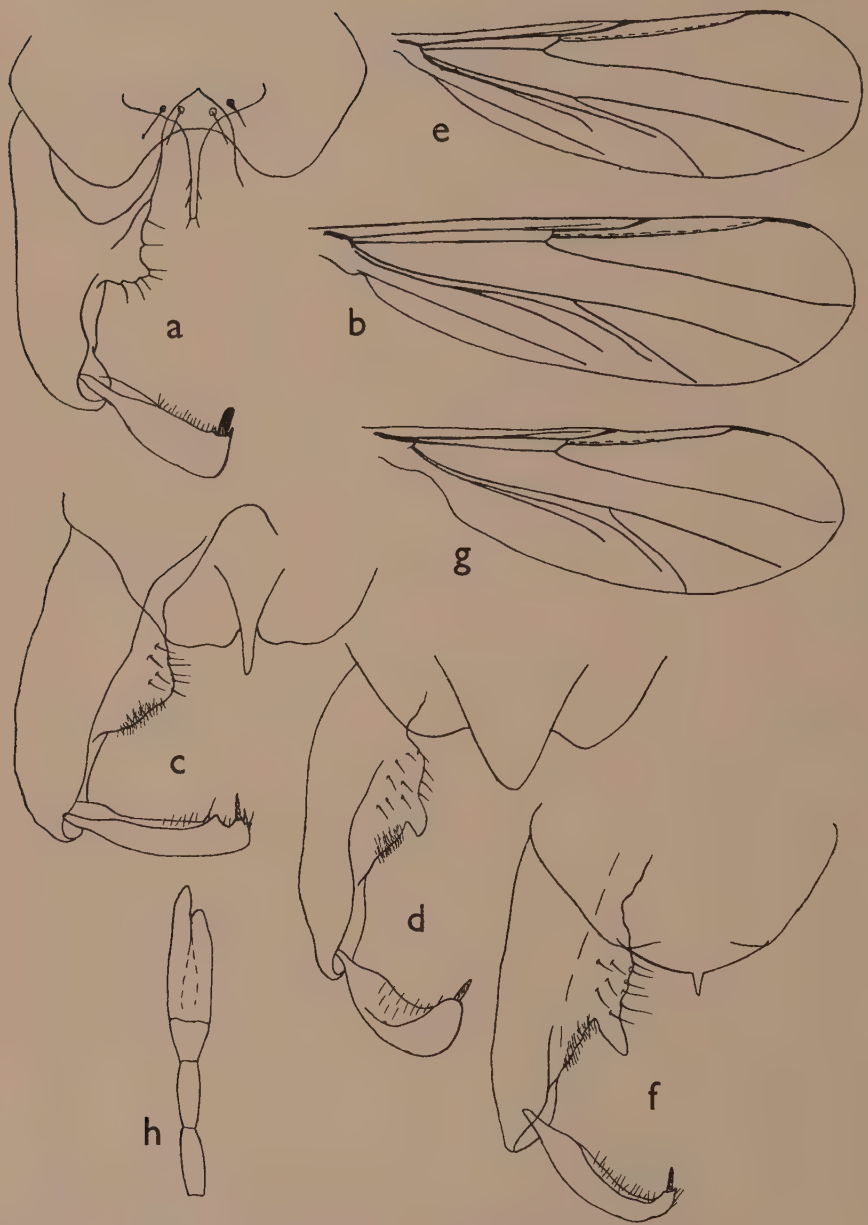


FIG. 5.—Hypopygial wings and antenna, apex of males of *Eukiefferiella* spp. (*a*) and (*b*) *E. niveipluma*; (*c*) *E. angustistilus*; (*d*) and (*e*) *E. brevitarsis*; (*f*), (*g*) and (*h*) *E. biloba*.

Eukiefferiella (Eukiefferiella) angustistilus sp. n.

A brownish insect with no strong markings; antenna with short hairs at the apex, halteres pale, squamal fringe well developed, empodium small; male hypopygium characteristic.

Male.—Wing length 1·3 mm.

Head yellowish brown, palpi and antennae dark brown, antennal flagellum with 13 segments, A.R. 0·4, last segment with short hairs at the apex; eyes bare. *Thorax* yellowish-brown with three dark brown more or less separate stripes, humeral pits rather large, postnotum and sternopleuron blackish. *Legs* pale brown, L.R. 0·7, pulvilli absent, empodium short. *Wings* milky, costa produced ending above tip of M_4, R_1 and posterior fork as in *E. niveipluma* sp. n.; An ending before posterior fork; squama with well developed fringe of about six hairs. *Halteres* pale. *Abdomen* brown, hypopygium (fig. 5*c*) with well-developed bare anal point; inner lobe of coxite not very prominent; style narrow with small inner flange and two apical spines, the larger dark, and the smaller transparent; IXth tergite bare.

Female.—In general resembles male but colour more yellowish; scutal stripes pale brown, poorly defined; apical antennal segment with short hairs and rather longer than two preceding ones together.

Holotype male, Berg River, Wellington, 18.v.52. Paratypes 1 ♂, 1 ♀, Berg River, French Hoek Forest Reserve, 21.xi.52.

Eukiefferiella (Camptokiefferiella) brevitarsis sp. n.

Readily distinguished from the other species described here by the bent cubital vein and small L.R. Male black, female with separate scutal stripes; squama bare, anal point of male broad.

Male.—Wing length 0·9 mm.

Head, mouthparts and scape black, flagellum brown with 11 segments, A.R. 0·4, apical antennal segment with short hairs at the tip; eyes bare. *Thorax* all black or very dark brown. *Legs* brown, empodium and pulvilli both seem to be absent, L.R. 0·4. *Wings* milky, venation as in fig. 5*e*; Cu bent, fork beyond r–m; costa produced but ending before level of M_4; squama bare. *Halteres* yellow. *Abdomen* black, hypopygium (fig. 5*d*) with well-developed broad anal point; both this and IXth tergite bare; inner lobe of coxite as shown; style evenly curved (seen in fig. slightly from apex) with no flange and a single apical spine.

Female.—Wing length 0·9 mm.

Head and thorax with yellowish ground-colour, scutum with three separated dark brown stripes; postnotum, sternopleuron, and abdomen brownish black. Terminal antennal segment with short hairs on the apical half, rather longer than the preceding two segments together. Wings and legs as in male.

Holotype male, Berg River, French Hoek, 30.vii.52. Paratypes, same data as holotype, 1 ♂, 1 ♀; Berg River, Wellington, 1 ♂, 1 ♀, 26.v.52; Berg River, Piquetberg, 1 ♂, 25.ix.52.

Eukiefferiella (? Parakiefferiella) biloba sp. n.

A minute insect with yellowish thorax and brown scutal stripes. Last antennal segment of male short and appearing to be bilobed; R_{4+5} ending well before the level of the tip of M_4; Cu straight, squama with 1–2 hairs; anal point of male short.

Male.—Wing length 1·0 mm.

Head: Face yellow or brown, vertex brown, antennae and mouthparts brown; eyes bare; antennal flagellum with 12 segments, last segment short (fig. 5*h*) and bilobed at the apex, one lobe longer than the other; penultimate segment short, forming part of the club;

last segment with short hairs only. *Thorax* yellowish or brownish with three separate dark brown stripes on the mesonotum ; postnotum and sternopleuron dark brown or black. *Legs* pale brown, empodium well developed, pulvilli absent, L.R. 0·8. *Wings* slightly brownish, venation as in fig. 5*g*, R_1 short, posterior fork below its tip, Cu straight, costa ending before level of tip of M_4 ; squama with one or occasionally two hairs. *Halteres* brown. *Abdomen* brown ; hypopygium (fig. 5*f*) with short anal point ; shape of inner lobe of coxite characteristic ; style narrow and slightly bowed.

Female.—Wing length 1·0 mm.

Fairly uniformly brown in colour, scutal stripes paler than in male ; last antennal segment with short hairs, rather longer than preceding two together ; legs and wings as in male.

Holotype male and 4 ♂, 6 ♀, paratypes, Berg River, French Hoek Forest Reserve, 30.vii.52 ; 3 ♂, 3 ♀, same locality, 22.x.52 ; 3 ♂, Kirstenbosch, 29.iv.52.

Limnophyes spinosa sp. n.

Limnophyes brevis Goetghebuer, 1934 *Rev. Zool. Bot. afr.* **25** : 203 (*pro parte*).

In his description of *L. brevis* Goetghebuer mentions the yellowish shoulders and the absence of anal point. Dr. P. L. G. Benoit of the Musée du Congo Belge has kindly arranged an exchange of paratypes with me which have shown that Goetghebuer's series was mixed ; one species has pale shoulders and a well-developed anal point, the other has an all black thorax and reduced anal point. Dr. Benoit has examined the holotype for me ; it has a well developed anal point, unlike Goetghebuer's figure. I am now able to give the following description of the second species.

A small black species with strongly curved Cu ; no scales on thorax and distinctive male hypopygium.

Male.—Wing length 1·2–1·5 mm.

Head, mouthparts, antennae and plumes black, A.R. about 0·5. *Thorax* entirely black, slightly shining, dorsocentrals uniserial, no scales on scutum. *Legs* brown, trochanters yellowish, L.R. 0·5 ; empodium well developed, pulvilli absent. *Wings* with well developed microtrichia, slightly greyish by transmitted light ; costa produced, R_{2+3} ending near R_1, M_{3+4} ending below R_{4+5}, Cu strongly curved, An ending more or less opposite fork which is well distal to cross vein ; squama with a few hairs. *Halteres* dark. *Abdomen* dark brown ; hypopygium (fig. 6*a*) with very short and widely conical anal point ; IXth tergite bare ; coxite with inner lobe ; inner margin of style rather bulbous ; articulated spine carried well at the apex, large, slightly curved and truncate ; in addition, the bases of two or three of the stronger hairs are sclerotised and resemble spines and the outer margin seems to be extended slightly as a spine.

Holotype male and 12 ♂ paratypes, Kirstenbosch, 29.iv.52.

In addition there is a male and a female from Bergvliet, 19–28.x.52, and a female from Zeekoe Vlei, 3.xi.52, which may belong to the same species ; the hypopygium of the male is damaged so that the identification cannot be confirmed. The females are paler than the males of the type series and have separate scutal stripes on a yellowish background, also Cu is less strongly bent.

Smittia nigra sp. n.

Quite black in both sexes ; A.R. about 1·3, L.R. 0·75 ; costa produced, Cu bent, anal angle obtuse ; anal point of male short and hairy.

Male.—Wing length 1·1–1·4 mm.

Head, mouthparts and antennae including plumes black ; eyes bare ; A.R. about 1.3.

Thorax quite black with some pruinosity. *Legs* dark brown or blackish, hairs black and long on posterior four, L.R. about 0·75; pulvilli and empodium absent. *Wings* (fig. 6*c*) milky; R_{3+4} reaching well beyond half-way from R_1 to R_{4+5}, costa well produced, posterior fork beyond r–m, Cu bent; anal vein ending slightly beyond fork, angle obtuse, squama bare. *Halteres* black. *Abdomen* black; hypopygium (fig. 6*b*) with short rounded hairy anal point, IXth tergite with some hairs immediately around anal point; coxite with small inner lobe, style without flange; apical spine double in one specimen.

Fig. 6.—Hypopygia and wings of males of Orthocladiinae. (*a*) *Limnophyes spinosa*; (*b*) and (*c*) *Smittia nigra*; (*d*) and (*e*) *Pseudosmittia capicola*; (*f*) and (*g*) *Orthosmittia hirtella*.

Female.—Wing length 1·4 mm.

Very similar to male in coloration, structure of legs and wing venation; apical antennal segment one and a half times as long as penultimate; costa strongly produced, more so than in male.

Holotype male and 2 ♂ paratypes, Berg River, French Hoek Forest Reserve, 22.x.52; 3 ♀, Bergvliet, 19–22.x.52.

Pseudosmittia Goetghebuer.

Pseudosmittia Goetghebuer, 1932, *Faune de France* **23** : 126 ; Edwards, 1932, *Entomologist* **65** : 141 ; Goetghebuer, 1943, *in* Lindner, *Flieg. Pal. Reg.* **3**, 13 : 102 ; Brundin, 1947, *Ark. Zool.* **39A** : 39.

In his original diagnosis Goetghebuer did not mention a type species. Edwards fixed *P. angusta* Edwards as the type species in 1932, but Goetghebuer appears to have overlooked this when he fixed his species *P. gracilis* as the type in 1943.

The genus includes all those species in Edwards' (1929) groups D and E of *Smittia* with Cu bent. Those of these groups with Cu straight are placed in *Orthosmittia* Goetghebuer.

Pseudosmittia capicola sp. n.

A small black species with bent Cu ; apical antennal segment of male hardly as long as the two preceding together, costa produced, R_{4+5} ending well before level of M_4.

Male.—Wing length 1 mm.

Head, mouthparts and antennae black ; last flagellar segment short, hardly longer than preceding two together ; eyes bare. *Thorax* completely black. *Legs* dark brown, L.R. 0·6, pulvilli absent. *Wings* milky, venation (fig. 6*e*) with costa produced, but apex of R_{4+5} basal to apex of M_4, posterior fork beyond r–m, Cu bent ; anal vein hardly reaching the fork ; lobe reduced, squama bare. *Halteres* black. *Abdomen* black ; hypopygium (fig. 6*d*) with well-developed anal point arising rather basally on the tergite, both bare ; inner lobe of coxite large and of characteristic shape, style narrow with large spine.

Female not known.

Holotype male and 3 ♂ paratypes, Berg River, French Hoek Forest Reserve, 22.x.52.

Orthosmittia hirtella sp. n.

Male all black, female yellowish with separate scutal stripes ; A.R. about 0·9 ; dorso-centrals more or less biserial ; costa slightly produced.

Male.—Wing length 1·0 mm.

Head and scape black, palpi and flagellum brown, plumes black, A.R. about 0·9 ; eyes bare. *Thorax* black, dorso-central bristles more or less biserial. *Legs* brown, empodium well developed, pulvilli absent, L.R. 0·5. *Wings* milky, venation as in fig. 6*g*, costa produced ; R_{4+5} ending before level of apex of M_4, posterior fork rather short and distal, Cu straight ; An short, anal lobe absent, squama bare. *Halteres* black. *Abdomen* black, hypopygium (fig. 6*f*) with well-developed bare anal point ; IXth tergite hairy, coxite with small inner lobe ; style flanges more or less developed.

Female.—Wing length 0·7–·8 mm.

Head, scape, mouthparts yellowish, flagellum brown ; last segment equal to preceding two together. *Thorax* yellowish, mesonotum with three separate dark brown stripes ; dorso-centrals more or less biserial, postnotum and sternopleuron dark brown. *Legs* and *wings* as in male, except that costa is more strongly produced. *Halteres* black. *Abdomen* black on tergites, sternites yellow, cerci brown.

Holotype male and 1 ♂ and 3 ♀ paratypes, Zeekoe Vlei, 3.xi.52.

Corynoneura Winnertz.

Corynoneura Winnertz, 1846, *Stettin. ent. Ztg.* **7** : 12 ; Edwards, 1929, *Trans. ent. Soc. Lond.* **77** : 367 ; Goetghebuer, 1939, *in* Lindner, *Flieg. Pal. Reg.* **3**, 13 : 4.
Eucorynoneura Goetghebuer, 1939, *ibid.* **3**, 13 : 4.
Paracorynoneura Goetghebuer, 1939, *ibid.* **3**, 13 : 7.

Edwards (1929) divided the genus into two subgenera, *Corynoneura* and *Thienemanniella*; they are now considered to be distinct genera. He further divided *Corynoneura* into three species groups on the arrangement of the hairs at the tip of the antennae. In addition he mentioned the presence in his group B of strongly sclerotised internal basal structures in the male hypopygium. A re-examination of his material shows the presence of these structures in all three groups and also in species of *Thienemanniella*. Goetghebuer raised these groups to genera and gave them the names quoted above.

There are three species of this genus in Dr. Scott's material; all show the internal hypopygial structures with significant differences and all show differences in the apical antennal hair arrangement. I consider that the differences used by Edwards and Goetghebuer for defining their groups and genera are really only specific differences and accordingly I do not recognise any subdivisions of the genus.

The main part of the internal hypopygial structure consists of a median unpaired sclerite with basal arms attached to the coxites (this is shown with line shading in the figures). Part of the way along each arm is a process which fits into the notch of the enlarged base of a curved "paramere" (shown stippled); the apical half of each paramere is flattened and blade-like. In the Palaearctic species the arrangement is similar.

Corynoneura scotti sp. n.

A minute dark insect, sometimes paler at the base of the abdomen in the male; female browner with separate scutal stripes; last antennal segment with apical rosette of short hairs which distinguishes it from *C. dewulfi* Goetghebuer; coxite with inner lobe, parameres long.

Male.—Wing length 0·6–1·0 mm.

Head, mouthparts, and antennae black or very dark brown; flagellum 10-segmented, last segment (fig. 7*d*) about as long as the two preceding together, slightly clubbed, with some plume hairs on its basal half and a rosette of short hairs at its apex; eyes bare. *Thorax* entirely matt black, or pleura may be pale, dorso-central bristles whitish. *Legs* yellow or brown, L.R. 0·6, posterior basitarsus twice as long as second segment. *Wing* venation as in fig. 7*b*. *Halteres* yellow or brown. *Abdomen* dark, blackish, usually rather paler on four basal segments, especially laterally, in one specimen whitish on these segments. *Hypopygium* (fig. 7*a*) with internal basal structures; coxite arms forming a V; parameres long and curved, with the apical portion flattened and blade-like; IXth tergite simple with no anal point and a few setae at the apex; coxites with an inner lobe near the apex, styles as shown.

Female.—Wing length 0·75–1·0 mm.

Head blackish, mouthparts yellow, antennae pale; last segment darker and with an apical rosette; all segments more or less equal. *Thorax* with yellowish background and three dark brown stripes usually well separated, scutellum and postnotum blackish. *Legs* yellow, halteres yellow, wing venation as in fig. 7*c*. *Abdomen* may be yellowish basally, darker near the apex, each segment translucent for apical quarter.

Holotype male, and 4 ♂, 2 ♀ paratypes, Kirstenbosch, 29.iv52; 3 ♂, 4 ♀, Berg River, Wellington, v. 1952; Berg River, French Hoek, 3 ♂, 30.vii.52, 1 ♂, 29.ix.52, 5 ♀, 22.x.52.

Corynoneura cristata sp. n.

Similar to *C. scotti* sp. n. as regards size, colour, wing venation, and proportions of the legs, differing in the structure of the apex of the antenna and in the hypopygium.

Male.—Antenna (fig. 7*f*) with 10-segmented flagellum ; last segment slightly clubbed, about equal in length to the preceding two together, with no plume bristles but with an apical rosette of long hairs, the individual hairs being longer than the segment itself. *Hypopygium* (fig. 7*e*) with internal sclerotised structures ; median structure much wider than in *C. scotti* and of a different shape, parameres short and flattened ; coxite with an internal lobe ; style straight basally and with apex sharply bent ; IXth tergite with 3–4 hairs and no anal point.

Female not known.

Holotype male and 2 ♂ paratypes, French Hoek Forest Reserve, 22.x.52.

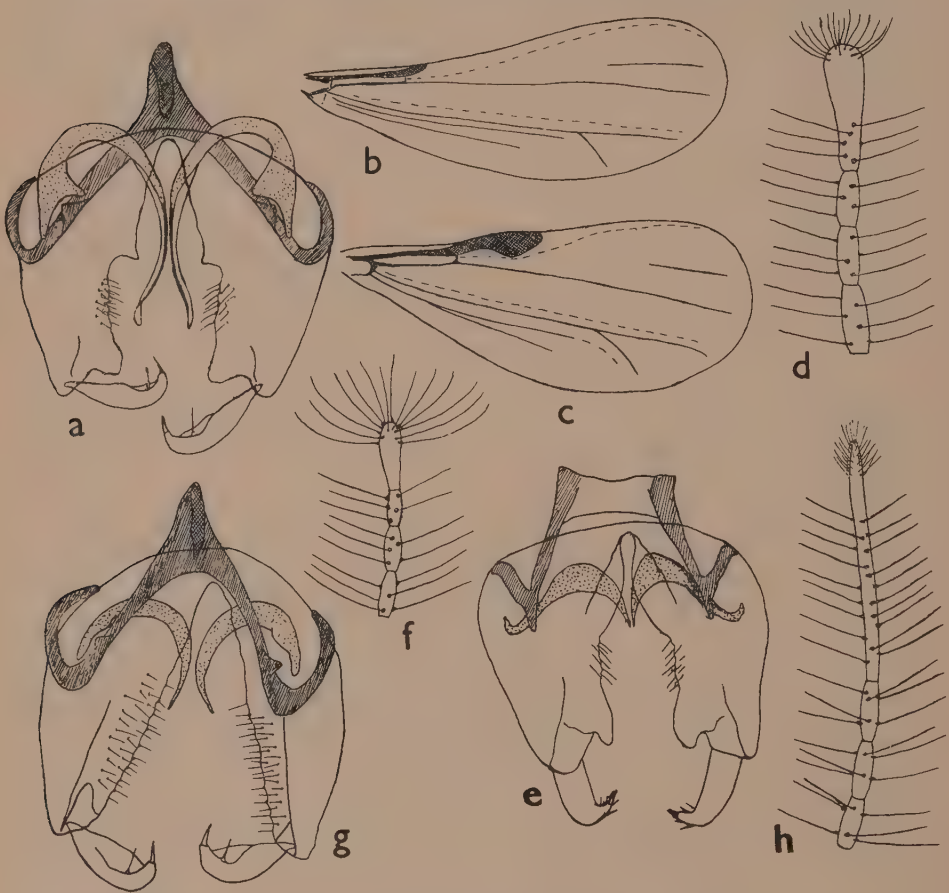


Fig. 7.—*Corynoneura* spp. *C. scotti :* (*a*) male hypopygium ; (*b*) male wing ; (*c*) female wing ; (*d*) apex of male antenna. *C. cristata :* (*e*) male hypopygium ; (*f*) apex of male antenna. *C. elongata :* (*g*) male hypopygium ; (*h*) apex of male antenna. Only the bases of the antennal plume hairs are shown.

Corynoneura elongata sp. n.

Similar to *C. scotti* and *cristata* spp. n. in size, colour, wing venation and leg proportions but differing in antennal and hypopygial structure.

Male.—Antenna (fig. 7*h*) with 10-segmented flagellum ; apical segment rather longer

than the preceding four segments together, narrow and not clubbed, with plume hairs for nearly three-quarters of its length, at the apex with short hairs not arranged in a rosette. *Hypopygium* (fig. 7*g*) with internal sclerotised structures very similar to *C. scotti* but parameres shorter, similarly flattened ; coxites with no inner lobe, styles similar to those of *C. scotti*.

Female not known.

Holotype male and 1 ♂ paratype Berg River, French Hoek Forest Reserve, 22.x.52 ; 4 ♂, Zeekoe Vlei, 3.xi.52.

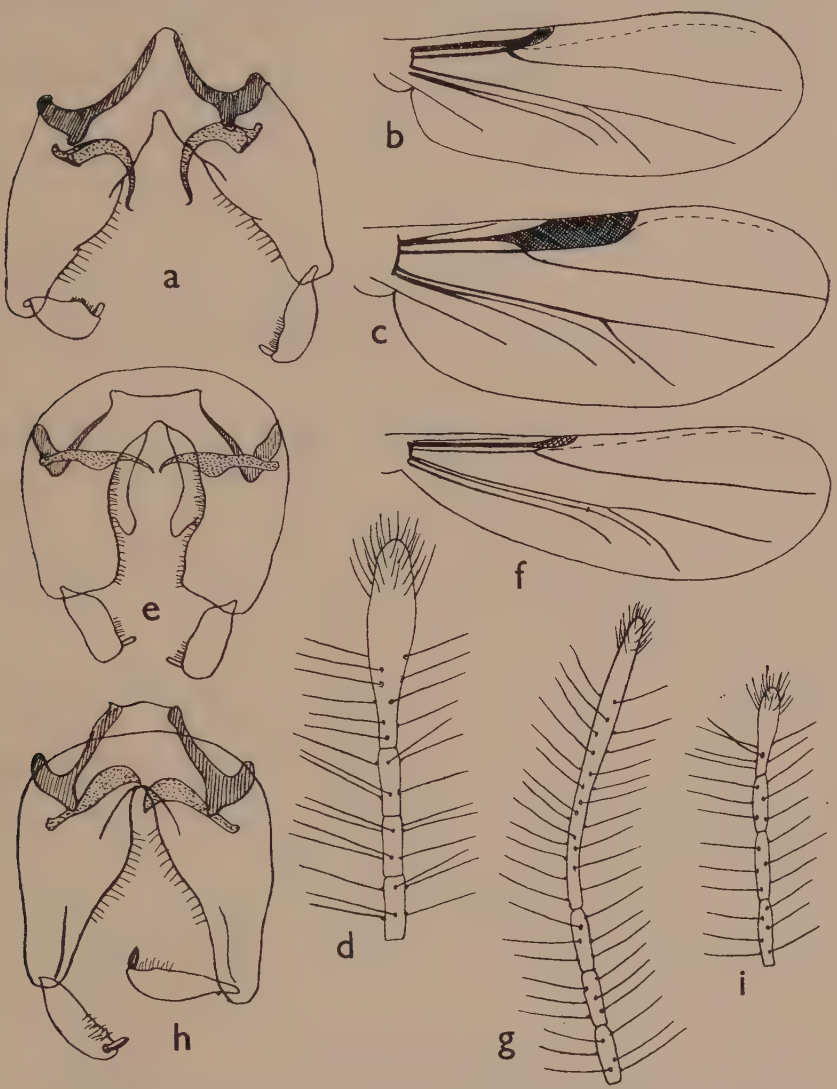


FIG. 8.—*Thienemanniella* spp. *T. analis :* (*a*) male hypopygium ; (*b*) male wing ; (*c*) female wing ; (*d*) apex of male antenna. *T. antennata :* (*e*) male hypopygium ; (*f*) male wing ; (*g*) apex of male antenna. *T. lineola :* (*h*) male hypopygium ; (*i*) apex of male antenna. Only the bases of the antennal plume hairs are shown.

Thienemanniella analis sp. n.

Male blackish, female more yellow with separate scutal stripes; last segment of male antenna as long as preceding three together; flagellum with 12 segments; wings milky with good anal area; first abdominal segment of both sexes with a group of four to six bristles each side.

Male.—Wing length 1–1·2 mm.

Head, antennae and plumes blackish, mouthparts brown; flagellum with 12 segments, last segment (fig. 8*d*) slightly clubbed and as long as the preceding three together, basal half of it with plume hairs; apex with short hairs; eyes with short pubescence. *Thorax* black, stripes fused. *Legs* brown, L.R. 0·75, fourth tarsal segment rather bilobed, last one flattened dorso-ventrally. *Wings* milky, venation (fig. 8*b*) with clavus not reaching to level of posterior fork, anal area well developed but not produced, squama bare. *Halteres*, with whitish knobs. *Abdomen* black, brown ventrally, with bristly hairs across the bases of all segments, segment 1 with a group of 4–6 each side only, segments 2–7 with 9–11 in a row across, segment 8 with 1–2 only. *Hypopygium* (fig. 8*a*) with internal sclerotised structures (see under *Corynoneura*), parameres strongly bent and curved at the tips; IXth tergite with no anal point and a few scattered short hairs at the apex.

Female.—Wing length 1 mm.

Head yellowish, antennae brown; segments 2–5 moniliform; segment 6 as long as 4 and 5 together with short hairs at the apex. *Thorax* yellowish with three separate brown scutal stripes; scutellum and base of postnotum yellow, apex of postnotum and sternopleuron brown. *Legs* as in male. *Wings* (fig. 8*c*) with clavus longer than in male, anal area also large. *Halteres* whitish. *Abdomen* brown with bristles arranged as in male.

Holotype male and 3 ♂, 18 ♀ paratypes, Berg River, French Hoek Forest Reserve, 22.x.52; 2 ♂, 6 ♀, same locality, 29.ix.52; 2 ♂, 1 ♀, Wemmer's Hoek, 15–18.v.52; 1 ♂, Berg River, Wellington, 20.v.52.

Thienemanniella antennata sp. n.

Very similar in general appearance to *T. analis* sp. n., but easily separated by absence of anal lobe and fewer abdominal bristles; separable from it and from *T. lineola* sp. n. by the elongate apical antennal segment of the male.

Male.—Wing length 1 mm.

Head and antennae black; flagellum with 10 segments only, last segment elongated (fig. 8*g*), about as long as preceding five together, with plume hairs for most of its length and short hairs at the tip; eyes pubescent. *Thorax* black, stripes fused. *Legs* as in *T. analis*. *Wings* (fig. 8*f*) lacking anal lobe, venation very similar to *T. analis*. *Halteres* yellow. *Abdomen* black with fewer bristles than in *T. analis*; segment 1 with only one each side, remainder with 3–5 in a basal row. *Hypopygium* (fig. 8*e*) with internal sclerotised structures as shown, coxite with inner thumb-like lobe, styles rather rectangular.

Female.—Two females taken at the same time as some males probably belong to this species; they resemble the female of *T. analis* except that the anal angle of the wing is reduced and the abdominal chaetotaxy is similar to the male.

Holotype male and 2 ♂ paratypes, Berg River, French Hoek, 30.vii.52; 1 ♂, 2 ♀, Berg River, Piquetberg, 25.ix.52, also 7 ♂, 2 ♀, 30.x.52 and 1 ♂, 26.xi.52.

Thienemanniella lineola sp. n.

The male is readily distinguished from the other two species described here by the separate scutal stripes; anal lobe reduced, flagellum of male antennae 10-segmented, last segment short; female similar to that of *T. antennata* sp. n.

Male.—Wing length 1 mm.

Head dark with yellowish face, antennae black, flagellum 10-segmented, last segment (fig. 8*i*) shorter than the two preceding together, with plume hairs basally and short hairs apically; mouthparts yellowish; eyes with short pubescence. *Thorax* yellow with separate blackish scutal stripes; the central one may be prolonged by a brown area; scutellum brown with yellow apex, postnotum and sternopleuron black. *Legs* similar to *T. analis*. *Wings* similar to *T. antennata*, anal lobe reduced. *Halteres* pale. *Abdomen* blackish, bristles reduced as in *T. antennata*; the available males have two bristles each side on segment 1 but the females sometimes have one only so this may be a variable character. *Hypopygium* (fig. 8*h*) with internal structures as shown, coxite and style simple.

Female.—A number of females taken with the males probably belong to this species; they cannot be separated from females of *antennata* in the material available to me.

Holotype male and 1 ♂, 7 ♀ paratypes, Berg River, French Hoek Forest Reserve, 22.x.52; 1 ♂, Kirstenbosch, 29.iv.52.

Book Notices.

American Social Insects. By Charles D. Michener and Mary H. Michener. The New Illustrated Naturalist Series. New York (D. Van Nostrand Company, Inc.), and London (Macmillan & Company), 1953. Pp. xiv + 267, 109 pls. (30 col.). Price $6.00.

A popular book on Social Insects of America written by two distinguished entomologists. The volume is divided into six parts: 1. The Nature of Social Insects; 2. The Hornets and other Wasps; 3. The Bees; 4. The Ants; 5. The Termites; and 6. Societies and their parasites, and is magnificently illustrated with over a hundred colour and half-tone plates. A bibliography of seven pages is included covering only the larger works and the more recent or more important smaller papers, principally written in English.

The Principles of Line Illustration. By L. N. Staniland. London (Burke Publishing Co., Ltd.), 1952. Pp. xii + 212, 161 figs. Price 25*s*.

This volume by a biologist and artist sets out to demonstrate how the difficulties of students and research workers in making drawings may be overcome. The book deals with the illustration of scientific work by line drawings and emphasis is placed on the variety of aids to drawing which are available or which can be constructed, since, provided a drawing is made according to sound principles it may be relied upon to reproduce well.

Chapters cover the techniques of line drawing; aids to accurate drawing; the use of colour; preparation of graphs, diagrams and histograms; help with lettering; and appendix of hints and tips.

This volume should be on the work table of all biologists and if widely studied would relieve the editors of scientific publications of much trouble they meet owing to unsatisfactory drawings or poor grouping and lettering.

A SECOND AUSTRALIAN SPECIES OF *MELIGETHES* STEPHENS (COL., NITIDULIDAE).

By A. M. Easton, M.B., B.S., F.R.E.S.

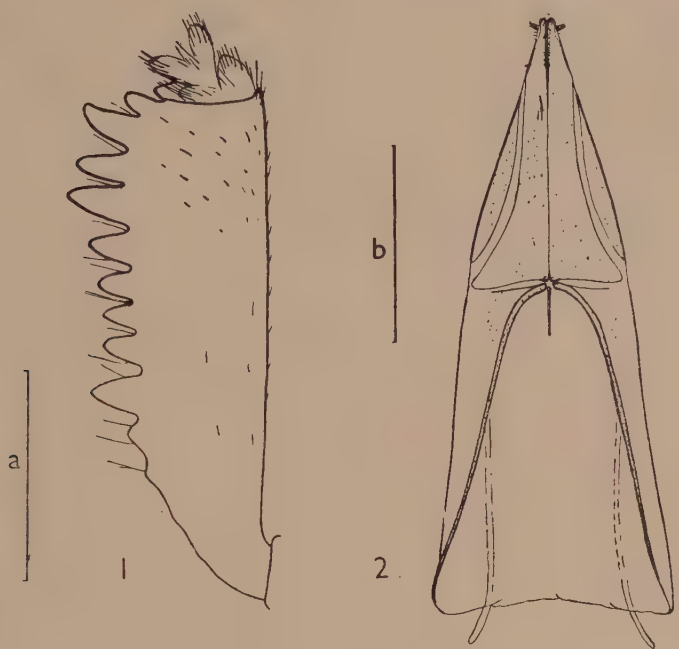
The species forming the subject of this paper is described from a single female specimen in the general collection of the British Museum (Nat. Hist.) derived from Melbourne, which had previously been labelled "*grandicollis*."

The name which I have chosen for it (*grandicollis* being preoccupied) is intended to emphasise the very strong transrugosity of its elytra, a character by no means uncommon in the genus, though not really well developed in any of the European species.

Meligethes imbricatus sp. n.

Female.—Length, 3·0 ; breadth, 1·45 mm. Elongate oval, moderately convex, rather dull, black with inconspicuous short, fine, close, golden pubescence ; legs almost black with a reddish tint, the front tibiae slightly lighter. *Head* transverse triangular, almost flat. Clypeus with the anterior margin deeply and widely emarginate, with the side angles sharp. Surface very finely and densely punctate, the punctures equal in size to the eye-facets and separated by half a diameter. Antennae with the first segment very dark reddish brown, the second yellow-brown, the succeeding segments gradually darkening to the almost black club ; the latter one and a half times as long and twice as wide as the first antennal segment. *Pronotum* large, one and a half times as wide as long (1·4 : 0·95 mm.), widest at the basal third, sides somewhat strongly rounded and more convergent towards the front. Anterior margin almost straight for the width of the neck, curving forward slightly at each end to the blunt obtuse front angles. Hind margin distinctly longer than the front (1·3 : 0·9 mm.), feebly convex and with its middle portion opposite the scutellum projecting slightly backwards, and on either side of this a distinct sinuosity ; hind angles obtuse and widely rounded. Sides narrowly bordered. Surface with punctures as fine as those of the head but separated by one and a half to two diameters, the spaces between smooth, but with a trace of reticulation near the base. *Elytra* scarcely longer than broad (1·5 : 1·45 mm.), widest at the basal third, where they are very slightly wider than the pronotum ; sides somewhat strongly rounded at the basal third, then gradually curving inwards towards the rounded hind angles ; the apex of each elytron very slightly oblique and almost truncate, the sutural angle blunt and obtuse. Surface showing very well-marked transverse rugosity, the punctures shallow and minute, being arranged in horizontal rows and almost hidden by the apparent imbrication of the surface. The punctures are separated by about two diameters from their neighbours in the same row, and the rows by a distance equal to about four to six times the diameter of a puncture ; from each puncture arises a recumbent golden hair which reaches beyond the row of punctures immediately behind. Surface between the rows smooth. *Scutellum* transverse, rounded at apex ; with punctures somewhat coarser than those of the pronotum, separated by about one diameter, the basal third reticulate, unpunctured. *Pygidium* finely rugosely punctate, with a tuft of long pubescence at its apex. *Ventral surface* black. Prosternal process widest a little in front of its apex, and here nearly twice as wide as the antennal club, slightly narrowed posteriorly to its abruptly truncate apex ; its shallow punctures slightly larger than the eye-facets and separated by about one diameter. Mesosternum unpunctured, its surface microscopically reticulate. Metasternum with punctures about

equal in size to those of the prosternum, but deeper and separated by two diameters, the surface between the punctures almost smooth. Abdomen with the first sternite much more finely punctured, though not so finely as the remaining four sternites, the punctures in each case separated by about two and a half diameters. Metasternum and last sternite (♀) without secondary sexual characters. The caudal marginal line of the hind coxal cavity follows closely the hind edge of the latter, turning back only immediately before reaching its outer end. *Legs* very dark reddish-brown, almost black, the front tibiae



Figs. 1–2. *Meligethes imbricatus* sp. n.—(1) Left front tibia of female: (2) Ventral view of ovipositor Scale *a* (fig. 1), 0·2 mm.; scale *b* (fig. 2), 0·25 mm.

lighter. Outer edge of front tibiae furnished with well-formed serrate teeth (fig. 1), a longer sharper outstanding one at the basal third being separated by a series of four (the left tibia has four, the right five) smaller subequal teeth from a group of larger teeth close to the apex; of this group the first and last are largest and are separated by one (two on the right tibia) shorter and narrower, and all bend slightly in a backward direction; beyond this group a much smaller tooth precedes the subtarsal plate. Outer edge of intermediate and hind tibiae furnished with an inconspicuous single row of close short spines, less stout on the hind legs; this edge on the intermediate pair evenly convex, on the hind straight to the apical fourth whence it is obliquely truncate; inner edge of front tibiae almost straight, of the others convex at the basal third, thence almost straight to the apex. Front tarsi slightly dilated, a little narrower than the antennal club; last segment a little shorter than the first four together; claws with a small basal tooth. *Genitalia* as figured (fig. 2). Ovipositor somewhat elongate and sharp pointed, the apex slightly pigmented; with a very fine sclerotised spicule running back in the ventral membrane for a short distance from the mid-point.

Male.—Not known.

Type.—♀ in the British Museum (Nat. Hist.), bearing the data: "Melbourne," 68.106, and a further tab with the name "*grandicollis.*"

Comparative notes.—This species belongs to the large group, so well represented on the African continent, in which the front tibiae on their outer edge bear a larger more prominent tooth at about the basal third, separated by a series of smaller ones from the group of larger teeth close to the apex. *M. grandicollis* Reitter, a South African species, has teeth of a different pattern, lacks the transrugosity of the elytra, and is distinct in many other characters. From *M. niesslii* Reitter, the only other species of the genus so far recorded from the Australian continent, the new species is amply distinct. *M. niesslii* is described as being of reddish-brown colour, its elytra are much longer in comparison with the pronotum, and are not transversely rugose, whilst the surface is microscopically reticulate; moreover the outer edge of its front tibia shows no more than a fine crenulation towards the apex. By these, as by other characters, it is at once distinguishable from *M. imbricatus;* indeed the absence from its last abdominal sternite of the bilateral semicircular impressed line raises some doubt as to its right to remain in the genus.

MIDDLE EAST LEPIDOPTERA. XII: TWO NEW SPECIES FROM SOUTH-WEST PERSIA (IRAN).

By E. P. Wiltshire, F.R.E.S.

Further study of the material which I collected at or near Shiraz, Fars, South-West Persia, in 1940–1 and again in 1949–51 has now enabled me to diagnose and publish hereunder two more new species, in continuation of my previous article.[1] They both belong to the family Agrotidae (Phalaenidae).

Arenostola delattini sp. n.

In aspect this new species comes between *phragmitidis* Hübner and *sohn-retheli* Püngeler. The wing-shape is similar, the general size somewhat larger than in *sohn-retheli*. Coloration is as in this latter, rather than as in *phragmitidis*, but the body is robuster than in *sohn-retheli*. The new species closely resembles *extrema* Hübner, except that it always lacks the black dots on the post-median fascia of the fore-wing of that species. The wing-shape differs greatly from that of *taurica* Staudinger, the fore wing of which is unusually narrow with arched costa.

Head, thorax and fore wing whitish grey, very slightly infused with ochreous pink or more heavily dusted in some examples with grey scales, especially at the lower corner of the cell, where a faint grey spot is usually discernible. The fringes and submarginal area are concolorous, not, as in *phragmitidis*, deeper ochreous than the rest of the fore wing, and in darker specimens it is the centre of the wing, near the cell-end, which appears slightly greyer than the rest. Hind wing more fuscous than fore wing, but with paler fringes. Fore-wing under-side ground-colour as upper-side, but diffusely shaded with greyish on the post-median, where the nervures stand out also diffusely darkened. This distinguishes the species from its closest congeners and is somewhat reminiscent of *A. elymi* Tr.

The sexes do not differ in wing-pattern.

The genitalia are quite distinct from the relatives mentioned above, the male genitalia being shown in fig. 1. I am indebted to Mr. D. S. Fletcher for examining the genitalia of the type (all three types are female) of *A. unicolor* Warren; he found them to be identical with those of *A. phragmitidis* Hübn. *A. unicolor* Warren is therefore the Central Asian subspecies of *phragmitidis*. The new Persian species is named after Dr. Gustav de Lattin who has aided me in various problems, and who kindly sent me a photograph of the male genitalia of *Arenostola sohn-retheli* Püngeler, which name in an earlier article[2] I had wrongly applied to the Persian species.

[1] The three immediately preceding articles in this taxonomic series were :—IX : Two new forms or species and thirty-five new records from Cyprus (1948, *Ent. Rec.* **60** : 79–87) ; X : New species and forms from Arabia and Persia and a description of the genus *Tamsola* from Iraq (1949, *Bull. Soc. Fouad Ier Ent.* **33** : 353–372) ; XI : More new species and forms from Persia (Iran) and Syria (1952, *id.* **36** : 187–210). The titles of the last two contain an error : *for* " IX " *read* " X " ; *for* " X " *read* " XI.")

[2] Seventy new records of Lepidoptera from Iran (1945, *Ent. Rec.* **57** : 77–85). Note : On p. 83, for " *sohn-retheli* Püng." read " *delattini* sp. n."

Holotype : ♂, Persia : c. 5500 ft., nr. Shiraz, in marshy stream, 14.vi.50. Allotype : ♀, 19.vi.41 ; paratypes, 3 ♂, 19.vi.41 & 25.vi.50. Same locality. In coll. m. & coll. Boursin.

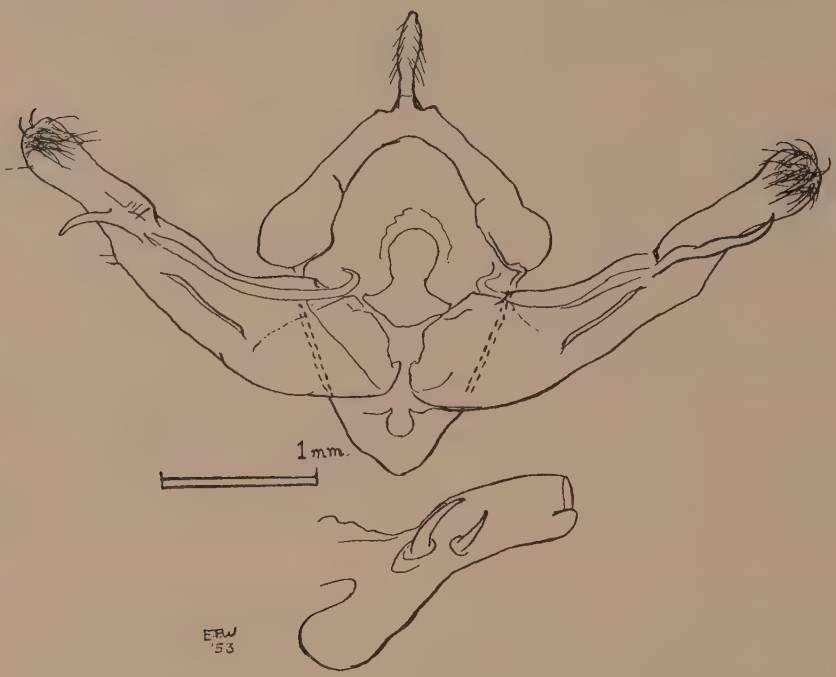


Fig. 1.—*Arenostola delattini* sp. n. Male genitalia, ventral open view, with aedeagus separated.

Porphyrinia popovi sp. n.

A new species, probably near *P. agnella* Brandt (the type of which appears to have been lost), but much larger and more prettily coloured and slightly more clearly marked than that species.

Palp, second segment ochreous above, white below ; third segment, white. ♂ antenna ciliate. Head, pro- and mesothorax white ; metathorax, slightly yellow.

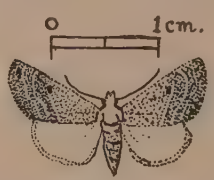


Fig. 2.—*Porphyrinia popovi* sp. n.

Fore wing, white, the ground-colour appearing principally along the costa, nearly to the apex. A spot, consisting of several black scales, in the cell. An oblique white line runs straight to this from the hind margin and does not appear to reach the costa ; the median area between the base and this line yellow, except on the costa ; between the line

and a more out-curved white submarginal line is a pale purple area. Subterminal area ochreous yellow, usually with a sub-apical black spot about 1 mm. from the costa. Fringes ochreous.

Hind wing whitish, suffused with ochreous terminad; fringes whitish.

Underside metallic whitish, unmarked. Span: 20 mm.

This species is named after my friend George Popov, who, while studying locusts, collected interesting lepidopterous material in Persia and Arabia from places which I could not visit myself and to whom I am therefore much indebted.

Holotype, ♂: PERSIA: Shiraz, hilly steppe c. 6000 ft., 30.ix.50 (in coll. m.).

Paratype, ♂: PERSIA: Shiraz, bare mountains c. 7000 ft., 26.vii.50 (in coll. m.)

A NOTE ON THE GROUP *LIGYRA* (*HYPERALONIA* OLIM) *VENUS* KARSCH (DIPTERA : BOMBYLIIDAE).

By S. J. Paramonov.

New material in the British Museum provides an opportunity to describe one new species from the *Ligyra venus* group and to add some essential details about other species. A new key to identification is also proposed so as to avoid any confusion in regard to this small group, which is probably richer in species than was formerly thought.

Key to species of the *Ligyra venus* Group.

1. Wings black, only apex (beyond the line which connects the apices of the first and fourth longitudinal veins) and an extremely narrow stripe along the hind border hyaline or slightly infuscated; most of outer part of discal cell also hyaline or infuscated. Abdomen below covered with black scales and hairs. Sides of second tergite and tip of abdomen with well developed spots of golden scales . . . 2.
–. Wings hyaline, with black base and two very broad black cross bands from anterior to posterior margin (one in the middle, the other before the apex). Abdomen below often with white hairs . . . 3.
2. Occiput red. Spot in discal cell quite hyaline; hind margin of wing also hyaline. Natal, Nyasaland, Portuguese East Africa. Length of body 12–19 mm. . . . . **L. mars** Bezzi, ♂, ♀.
–. Occiput black. Hyaline spot in discal cell and stripe along hind border of wing infuscated. Portuguese East Africa. Length of body **11 mm.** . . . . . **L. vulcanus** Bezzi, ♂.
3. The golden spots of scales present only at tip of abdomen (on sixth and seventh tergites). Collar hairs bright orange-reddish . . . . . 4.
–. The spots of golden scales present also at base (on second tergite). Collar hairs yellow or black . . . . . 5.
4. Abdomen below black, with black hairs, except on basal half where they are white. Wings as in Bezzi, (1924, *Bombyilidae Ethiop. Reg.*, figs. 44, 45). White scales on sides of face rather dense and with a silvery reflection. Central Africa . . . . . **L. venus** Karsch, ♀.
–. Abdomen below black, with very long, but not dense whitish hairs, usually visible only under a lens; in general this side appears black. Wings as in *L. cupido* (Bezzi, fig. 46), but apex of wing darkened as in male of *L. venus*. Whitish scales on face more sparse. Kenya. **L. minerva** sp. n., ♀.
5. Nearly whole of second tergite and anterior corners of third covered with golden scales. Collar hairs yellow-orange. Abdomen below at base with white hairs. Anal cell nearly hyaline. Cameroons, Kenya (Makindu, Kasigau) . . . . . **L. enderleini** Paramonov, ♂, ♀.
–. On second tergite only golden side spots, a golden cross band absent. Collar hairs black. Abdomen below mostly black haired, only on the middle a whitish stripe. Anal cell black. Nyasaland. **L. cupido** Bezzi, ♂,♀.

Ligyra minerva sp. n.

Female.—Similar to *L. mars* Bez., but distinguished at once by its nearly hyaline upper basal cell *a.s.f.*

Ground colour of body deep-black, only sides of frons, face and scutellum a little reddish. Antennae deep-black, third segment a little lighter, long, regularly conical, 3 times longer than its apical style; twice (with the style) length of two basal segments together. Hairs on basal segments as on head black, dense, erect, but not long. On sides of reddish face there are short whitish scales more dense at mouth margin; also some dispersed scales on frons. Vertex approximately equal to one-sixth of head width. Mouth cavity at broadest point is smaller than one-third, but larger than one-fourth of head width.

Thorax black, with black hairs, bristles and very small scales, but collar hairs bright orange; a tuft of similar hairs on upper part of mesopleurae, and another but smaller tuft on metapleurae above the hind spiracle. Anterior part of sides of thorax (before the line connecting base of wing and middle coxae) covered with dense, long, silky, whitish hairs, which separate the above mentioned orange hairs from the base of the wing; below from the orange hairs, a very small tuft of black hairs also present. Hind coxae, viewed from the side, with a very clearly demarcated tuft of silky whitish hairs.

Legs black, with long black scales on apical part of hind femora, on both sides of hind tibiae, on outer side of hind metatarsus, and more or less developed on outer side of first segment of hind tarsi; remaining three segments without scales. Claws short, only half as long as the last segment of tarsus. Halteres black.

Venation and wing pattern very similar to *L. cupido* Bezzi (Bezzi, fig. 46), but apex darkened and only middle of three apical cells lighter; hind border also darkened, but less intensively than anterior border. Greater part of upper basal cell hyaline, strongly contrasting with its base, apex and very narrow lower stripe, which are very dark-brown, almost black. Middle part of anal cell lighter than basal and apical parts; axillar cell also lighter in its basal half.

Abdomen deep velvet black, with black hairs and scales, but outer quarter of first tergite whitish haired, and sides of second tergite also with dense whitish hairs. Sixth and seventh tergites covered with very dense, long and narrow hair-like golden scales, which together form a bright golden shining spot; the golden scales not reaching the sides of sixth tergite. Entire underside of abdomen black, but with very long, not dense, whitish hairs which are distinguishable mostly under a lens.

Length of body, 15·5 mm., of wing, 20 mm.

KENYA: 1 ♀, xi–xii.1933, Rabai (*van Someren*). Type in the British Museum.

Ligyra venus Karsch, ♀.

Karsch, 1887, *Berlin. ent. Z.* **31**: 173. 14, tab. IV, fig. 8.

" Im Berliner Museum fand ich die typischen Exemplare dieser Art; alle sind Weibchen (3 Stück). Die Grundfarbe des Körpers schwarz, doch sind die Stirn, das Gesicht, Schildchen und die hinteren Ecken des Thoraxrückens rötlich. Stirn, Gesicht und Fühler schwarzhaarig, die beiden ersten mit unzahlreichen weisslichen oder schwach gelblichen zerstreuten Schuppen; die Schuppen auf den Gesichtsseiten sind ziemlich dicht und bei einer gewissen Betrachtungsweise zeigen sie einen starken, silbernen Glanz; der Hinterkopf ist mit ebensolchem Glanz versehen. Die Angabe von Karsch, das die Stirn " braunrot behaart " ist, ist nicht richtig, augenscheinlich bezieht sich das auf die rötliche Grundfärbung der Stirn. Die Behaarung des Vorderrands des Thoraxrückens, ein Büschel vor der Flügelbasis auf den Thoraxseiten, sowie ein zweiter Büschel vor dem Schwinger von schönen grell orangerötlichen Färbung. Der Vorderteil der Brust unten, ein breiter Streifen von der Flügelbasis zu den Hüften sind mit glänzenden, dichten, weissen Haaren bedeckt; ein Fleck aus ebensolchen Haaren befindet sich auf den Hüften. Alle übrigen

Haare, Borsten und Schuppen der Brust sind dichtschwarz. Beine und Schwinger schwarz. Die Hinterschienen mit zahlreichen, langen, abstehenden, schwarzen Schuppen, die jedoch nicht länger als die Borsten sind. Metatarsus der Hinterbeine auch deutlich gefiedert.

Hinterleib aber mit tiefschwarzen Schuppen und Haaren, doch auf den zwei hinteren Segmenten befinden sich goldene Schuppen, die einen rundlichen Fleck bilden, doch reichen diese Schuppen auf dem vorletzten Segment nicht bis zum Seitenrand. Die Behaarung des 1. und 2. Segments auf den Seiten (mit Ausnahme der hinteren Ecken des letzteren) ist weisslich mit einer leichten gelblichen Abtönung. Unten ist der Hinterleib schwarz, schwarzhaarig, nur die Haare auf der Basalhälfte sind weiss; Flügel wie auf den Abbildungen von Karsch und Bezzi.

Diese Art hat Bezzi (The Bombyliidae of the Ethiop. Region, p. 376) nicht richtig interpretiert; die von ihm angegebene Beschreibung bezieht sich auf eine andere Art, die ich unter den anderen Materialien des Berliner Museums aufgefunden habe und als *H. enderleini* sp. nov. benennen will." (Paramonov, 1929, *Mem. Acad. Sci. Ukraine, Phys. math.* **13**: 186).

The author has not seen further specimens of this species. The specimens which Bezzi regarded as belonging to this species, belong in fact to *L. enderleini* Param.

So far only three specimens, described by Karsch, 1887, and redescribed by Paramonov, 1929, are known.

Ligyra enderleini Par. ♂, ♀ (= *venus* Karsch sensu Bezzi, 1924).

"Der *H. venus* Karsch sehr ähnlich, doch unterscheidet sie sich dadurch, dass die Schuppen auf dem Gesicht eine deutliche gelbliche Abtönung haben. Die orangerote Färbung ist nicht so grell. Am besten unterscheidet sie sich durch das 2. Hinterleibssegment, das fast durchweg mit goldigen Schuppen bedeckt ist. Diese Schuppen fehlen nur längs dem Hinterrand des Segmentes in der Mitte, doch befinden sich Exemplare, bei denen diese Schuppen auch die vordere Ecke des 3. Segments einnehmen (bei *H. venus* ist die Hinterleibsbasis mit tiefschwarzen Schuppen bedeckt, ohne irgend welche Spur von goldigen Schuppen, dieselben sind nur auf den zwei letzten Segmenten vorhanden). Die Schuppen auf den Hinterschienen und auf dem Metatarsus sind besonders lang und dicht (stark gefiederte Schienen). Die Färbung und Zeichnung des Flügels wie bei *H. venus* auf der Abbildung von Bezzi (figs. 44, 45) doch ist der schwarze Streifen auf der Spitze bei den ♂♂ nicht so stark entwickelt wie es auf der Bezzi'schen Abbildung dargestellt ist, er ist nur etwas mehr als beim ♀ entwickelt."

"Kamerun int. Kokumi, 27–30.vii.09. Riggenbach". (Paramonov, 1929: 186–187.)

The author has seen also: KENYA: 1 ♂, xi.1936, Makindu (*McArthur*); 1 ♀, xi.1938, Kasigau; TANGANYIKA: 1 ♀, ix.1937, Dar-es-Salaam (*Saska*).

The following details can now be added:

Golden scales cover the entire sixth and seventh tergites, hairs on sides deep black; fourth and fifth tergites only with black hairs and scales; third and second tergites with a deep, black triangle, base of which is hind border of third tergite and apex of which reaches middle of second tergite. At sides of this triangle scales are golden and hairs at sides of abdomen yellowish, nearly white. The long, flattened scales on hind tibiae and tarsi (only last segment of tarsi destitute of scales) distinctly longer than tarsi or metatarsus or other segments of tarsi. Abdomen below covered with snow-white scales and hairs, the last three sternites with black ones. Snow-white scales on face extremely dense, shining.

INDEX.

New names are marked with an asterisk.

Acupalpus, 175
adelogamia, Mesa, *comb. nov.*, 18
*admaritima, Proisotoma (Proisotoma), 103–105
*adumbrata, Psychoda, 181
aequistylus, Onychogomphus, 189, 191–193
affine, Agonum, 171
affinis, Cryptocheilus, 35, 38
Agonoderus, 175
Agonum, 169, 170–171
Agriocnemis, 125–126
albilabris, Cicindela, 169
albistigma, Ischnura, 122
aldanicum, Europhilus, 171
*aliwalensis, Hedybius, 91
Amara, 172–173, 175
amazonica, Eodiatraea, *comb. nov.*, 180
americanum, Omophron, 177
amnemonella, Eodiatraea, *comb. nov.*, 180
amputatus, Harpalus, 174, 175
*analis, Thienemanniella, 212
*angeli, Oreixenica ptunarra, 79–82; *life history*, 80
angelicae, Dysaphis, 95–96, 99, 100
angelicae, Sappaphis, 95
angolensis, Mesa, 18
*angustistilus, Eukiefferiella, 205
*angustus, Crictopus, 132–133
angustus, Tenuitarsus, 41–47; *synonymy*, 43–44; *forms*, 44
Anisodactylus, 174
Anisogomphus, 189, 190–191
annulatilis, Cryptocheilus, 35, 38
annulioris, Culex (Culex), 20
*antennata, Thienemanniella, 212
Anuraphis, 95
Aphis, 109–118
Aphycoides, 3–4
apicalis, Culex, 106–108
apiifolia, Anuraphis, 95
apiifolia, Dysaphis, 96
Arenostola, 217–218
Argutor, 171
atriceps, Braunsomeria, 16
atrimedius, Tachycellus, 175
*auricullariae, Camptodiplosis, 196–199

babuli, Thilakothrips, 33
barnesi, Mycophila, 195
basilaris, Harpalus, 173
bembidioides, Sericoda, 169
Bembidion, 175–176
*bergensis, Orthocladius, 135
*biannulata, Cyclopodia, 59–60
bicolor, Argutor, 171
bicolor, Cryptocheilus, 37, 39
*bicolor, Selasia, 85
Bidessus, 25–26
biformis, Brunettia, 181; *redescription*, 185–186
*bigibossus, Colotes, 88–89
*biloba, Eukiefferiella (Parakiefferiella), 205–206
bimaculatum, Bembidion, 175–176
bimaculatus, Peryphus, 175–176
bituberculatus, Formicomus, 12
bivittatus, Temnogomphus, 189, 190
boleti, Camptodiplosis, 195, 196–197
boleti, Mycetodiplosis, 195
Brachycaudus, 109
brachyptera, Pezomyia, 195
Bradycellus, 175
Braunsomeria, 15–16
brevicornis, Argutor, 171–2
brevilabis, Curtonotus, 172
brevipennis, Cymindis, 169
brevipetiolatus, Procladius, 129
*brevitarsis, Eukiefferiella (Camptokiefferiella), 205
Brunettia, 181, 185–188
buxtoni, Ischnura, 124–125

Calosoma, 169
*cameroonensis, Prosthaptus, 86
Camptodiplosis, 195–199
Camptokiefferiella, 205
Canthyporus, 30–31
capensis, Mesa, *comb. nov.*, 17–18
*capensis, Potamonectes, 27–28
*capensis, Trichocladius, 133
*capicola, Pseudosmittia, 208
*capitata, Mesa, *comb. nov.*, 18
CARABIDAE, *Kirby's N. American types of*, 167–177
carbo, Agonum, 171
carus, Acupalpus, 175
castanipes, Helobia, 169
castanipes, Poecilus, 172
*catharsii, Ceroptera (Ceroptera), 7–8
caudalis, Anisogomphus, 190
*cavicornis, Illops, 90–91
CECIDOMYIDAE, *from fungi*, 195–200
Celia, 173, 175
centrella, Eodiatraea, *comb. nov.*, 178–180
*centripetalis, Dentachionaspis, 64–66
Cephaloncus, 86–87
Ceroptera, 5–8
*Ceropterella, Ceroptera *subgen.*, 5–7
Cerotelion, 199
chalceum, Agonum, 171
chappuisi, Formicomus, 147, 149
Chionaspis, 61–64
CHIRONOMIDAE, *from W. Cape Province*, 127–135, 201–213
Chlaenius, 169
chorleyi, Culex (Culex), 21
Chrotogonus, 41–43
cicatricosum, Agonum, 169
Cicindela, 169
cinerea, Lestremia, 195
clairvillei, Elaphrus, 176
clairvillii, Elaphrus, 176

cognatus, Trichocellus, 175
Colotes, 87–90
*comata, Pentaneura, 129
comma, Agonoderus, 175
compositellae, Aphis, 109–118; *colour notes*, 110–111; *sclerotisation*, 111; *morphology*, 111–112; *systematic discussion*, 112–114
concolor, Peryphus, 176
confinis, Cryptocheilus, 35, 38
*conicus, Orthocladius, 201
conjunctus, Stenolophus, 175
consimile, Europhilus, 171
Coprodiplosis, 195, 199–200
cordicollis, Chlaenius, 169
Corynoneura, 208–211
cribricollis, Cymindis, 169
Crictopus, 130–133
*crispi, Pericoma, 69–71
*cristata, Corynoneura, 209–210
Cryptocheilus, *key to spp.*, ♀♀, 35–37; ♂♂, 38–39
Cryptochile, 157–160
Cryptochilini, *South African*, 155–163
Culex, 106–108; *spp. from West Nile District, Uganda*, 19–22
cupido, Ligyra, 220
cupreum, Agonum, 170–171
Curimosphena, Himatismus, 155–156
Curtonotus, 172
*Cychrochile, 160–163
Cyclopodia, 59–60
cylindrica, Amara, 172
Cymindis, 169
Cyrtonotus, 172

*davidi, Syntretoriana, 165–166; *feeding habits*, 166
*delattini, Arenostola, 217–218
Dentachionaspis, 64–66
Dentatus, 99
decens, Culex (Culex), 21
decipiens, Bembidion, 176
desertus, Harpalus, 174
Diamesa, 127
Dictyoploca, *sp. n.*, 145
dilutipenne, Agonum, 170
discors, Amara, 173
Docosia, 199
Dollman, H. C., coll. of Formicomus, 147–154
*dollmani, Formicomus, 147, 151–153
*dolorosa, Pacificagrion, 119–120
duodecim-guttata, Cicindela, 169
dusoleili, Pentaneura, 128
Dysaphis, 95–102; *synonymy*, 100; *key to spp.*, 100; *use of name*, 100–101
Dysidius, 172
Dytiscidae, *new spp. from S. Africa*, 23–31

egregius, Cryptocheilus, 36, 38
Elaphrus, 176–177
elegans, Cryptocheilus, 36, 39
*elongata, Corynoneura, 210–211
enderleini, Ligyra, 220, 222
*Eodiatraea, 178–180
Epitragini, *South African*, 155–163
*erodioides, Cychrochile, 160–163
errans, Agonum, 171
erythropum, Agonum, 171
erythropus, Pterostichus, 171
Eudactylocladius, 202–203
Eukiefferiella, 203–206
Europhilus, 171
Euphoriana, 165
Euphorinae, *Australian*, 164–166
evansi, Tenuitarsus, 41–44
exaratum, Europhilus, 171

fabricii, Cryptocheilus, 36, 38
famosa, Fenella, 136, 138
fastidiosus, Argutor, 172
femoralis, Argutor, 171
Fenella, *revision of*, 136–138; *key to spp.*, 137–138
*fenestrata, Ramachandraspis, 67
ferruginea-striata, Dysaphis, 95–97
ferulae, Dentatus, 99
*fimbriata, Thilakothrips, 33–34
flavipes, Trechus, 175
*flavozonatus Crictopus, 131
flynni, Oreixenica, orichora, 82, 84
foeniculus, Anuraphis, 95
foeniculus, Dysaphis, 97–98, 99, 100
formicarius, Cryptocheilus, 37, 39
Formicomus, 9–14; *from H. C. Dollman's coll.*, 147–154
frigidum, Calosoma, 169
*fulgens, Crictopus, 130–131
fuliginosus, Stenolophus, 175
fulvicollis, Cryptocheilus, 36, 39
fungicola, Mycophila, 195

ganglbaueri, Formicomus, 11, 12
gemellum, Agonum, 169
gestroi, Formicomus, 11–12
gibba, Amara, 173
gilvipes, Dicosia, 199
Gomphidia, 189–190
Gomphidae, *notes on*, 189–194
grandicollis, Meligethes, 214, 216
*granulata, Fenella, 136, 138
grapei, Bembidion, 176
gratiosum, Agonum, 170
guttulatus, Cryptocheilus, 37, 39

haemastigma, Ischnura, 122–123
haematopus, Pterostichus, 172
Harpalus, 173–175
harrisi, Agonum, 171
*harrisoni, Yola, 24–25
Hedybius, 91–92
Helobia, 169
Helomyza, 199
herceus, Oreixenica lathionella, 73, 74, 82–83
heterogamia, Mesa, 17
hieracii, Myzus, 110
hieracii nigrum, Submacrosiphon, 109
hieroglyphicum, Isomma, 194
hieroglyphicum, Merogomphus, 189
Himatismus, 155–156
Hirmoplataphus, 176
hirta, Sciophila, 199

*hirtella, Orthosmittia, 208
horridus, Culex (Neoculex), 19
hortensis, Culex (Neoculex), 108
hudsonica, Cymindis, 169
hudsonicus, Argutor, 171
*Hydrodessus, 55–56
hydropicus, Trechus, 175

ichneumonoides, Cryptocheilus, 36, 39
Illops, 90–91
*imbricatus, Meligethes, 214–216
*imitator, Bidessus, 25–26
immunis, Trechus, 175
impunctifrons, Chlaenius, 169
inaequalis, Amara, 173
inculta, Dysaphis, 98–99, 100
inculta, Yezabura, 95
infradentata, Meria, *comb. nov.*, 17
inornata, Tachyta, 176
intermedius, Elaphrus, 176
intermedius, Notaphus, 176
interpunctatus, Harpalus, 174
interrupta, Agriocnemis, 125–126
interstitialis, Amara, 173
invalidum, Europhilus, 171
*irritans, Philonthus, 139–141
Ischnura, 122–125
Isomma, 189, 194
Isopleurus, 175

*jucunda, Lucretilis, 142–143
judaica, Fenella, 138
judaica, Paraphyllotoma, 136, 138
judaicus, Culex apicalis, 108

*kirbyi, Harpalus, 174
Kuwanaspis, 66

labradorensis, Argutor, 171
labradorica, Nebria, 169
*laccophiloides, Canthyporus, 30–31
Laccophilus, 23–24
lachrymosa, Pacificagrion, 119, 120–122
lacuniarum, Peryphus, 176
lacustris, Formicomus, 147, 148
laevipennis, Amara, 173
lapponicus, Elaphrus, 177
laranda, Oreixenica lathionella, 73, 82–83
laserpitii, Dysaphis, 99
lathionella, Oreixenica, 73–75, 80–82, 83
latialis, Oreixenica, 73–75
latialis, Oreixenica lathionella, 73–75
latior, Curtonotus, 172
*laurencei, Telmatoscopus, 71
leconteianus, Pterostichus, 171
lene, Agonum, 170
Lestodiplosis, 199–200
Lestremia, 195
leucoscelis, Chlaenius, 169
Ligyra, 220–222; *key to spp. of* venus *group*, 220
Limnophyes, 206
lineatus, Cerotelion, 199
*lineola, Thienemanniella, 212–213
*livingstonei, Formicomus, 147, 153–154
*lobiger, Pseudorthocladius, 201
longicollis, Harpalus, 174
longilabris, Cicindela, 169
longior, Harpalus, 174
*longissima, Kuwanaspis, 66
longistigma, Merogomphus, 189, 191
longulum, Bembidion, 176
lucidum, Peryphus, 176
Lucretilis, 142–143
lucublandus, Pterostichus, 172
lugubris, Xestonotus, 174

*malleopensis, Psychoda, 182–183
Malthinus, 85–86
mandibularis, Argutor, 171–172
marginata, Mycomia, 199
marginatus, Cymindis, 169
*maroccana, Rhamphomyia, 57–58
mars, Ligyra, 220
matritensis, Aphycoides, 3–4
*maweena, Oreixenica lathionella, 82–83
maynei, Formicomus bituberculatus, 12
Meligethes, 214–216
*merceti, Aphycoides, 4
Meria, 16–17
Merogomphus, 189, 191
Mesa, 17–18
Metriocnemus, 129–130
Miastor, 195
Microcricotopus, 203
Microtonus, 165
*minerva, Ligyra, 220, 221
minuta, Fenella, 136, 138
moesta, Nebria, 169
monilicornis, Fenella, 136, 138
*multicostata, Cryptochile, 157–160
musarum, Culex (Culex), 21
mutus, Pterostichus, 172
Mycetodiplosis, 195
Mycodiplosis, 195, 196
Mycomia, 199
Mycophila, 195
Myzus, 110

*nama, Oreixenica paludosa, 75–76
nana, Tachyta, 176
Nasonovia, 109–118
neavei, Culex (Culex) univittatus *var.*, 20, 22
Nebria, 169
Neoculex, 106–108
Nesoxenica, 73
niesslii, Meligethes, 216
nigerrimus, Anisodactylus, 174
nigra, Nasonovia, 109–118; *colour notes*, 110–111; *sclerotisation*, 111; *morphology*, 111–112; *systematic discussion*, 112–114
*nigra, Smittia, 206–207
nigrinus, Tachycellus, 175
nigripes, Bembidion, 176
nigripes, Notaphus, 176
nigrita, Anisodactylus, 174
nigrita, Fenella, 137
*nigriventris, Philhedonus, 93
nigromarmorata, Pentaneura, 128–129
nigrum, Submacrosiphon hieracii, 109
nitens, Bembidion, 176
nitida, Amara, 175
*nitidosa, Ceroptera (Ceropterella), 5–7

nitidum, Bembidion, 176
nitidus, Isopleurus, 175
nitidus, Peryphus, 176
nitidus, Platyderus, 171
*niveipluma, Eukiefferiella (Microcricotopus), 203
Notaphus, 176
notatus, Cryptocheilus, 35, 38
nudicaulium, Yezabura inculta, 95

obconiceps, Formicomus, 12
obliteratus, Elaphrus, 177
obesulus, Harpalus, 173
obscurior, Elaphrus, 177
*obscurus, Crictopus, 131–132
*ochraceus, Hedybius (Hedybiinus), 91–92
ochropus, Harpalus, 174
occipitalis, Anisogomphus, 190
octomaculatus, Cryptocheilus, 37, 39
ocypoides, Philonthus, 139, 141
ODONATA, *Ischnurine, from Samoa*, 119–126
Omaseus, 172
*omeri, Formicomus, 12–14
Omophron, 177
Onychogomphus, 189, 191–193
Opisthius, 176
Oreixenica, 73–84
orichora flynni, Oreixenica, 82, 84
*orientalis, Parlatoria, 67–68
orites, Temnogomphus, 190
Orthocladius, 135, 201
Orthosmittia, 208

Pacificagrion, 119–122
pagnioni, Formicomus, 147, 149
Pagurodactylus, 93–94
*pallidulus, Colotes, 87–88
pallipes, Amara, 172
paludosa, Oreixenica, 73–75
Parakiefferiella, 205–206
*parallelus, Pagurodactylus, 94
Paraphyllotoma, 136, 138
Parlatoria, 67–68
patruele, Bembidion, 176
patruelis, Amara, 173
patruelis, Pterostichus, 171
pennsylvanicus, Chlaenius, 169
pennsylvanicus, Harpalus, 174
Pentaneura, 127–129
Pericoma, 69–71
perornata, Meria, *comb. nov.*, 17
Peryphus, 175–176
petrosum, Peryphus, 176
petroselini, Yezabura inculta, 95
Pezomyia, 195
Philhedonus, 92–93
Philonthus, 139–141; *emended key to 3 spp.*, 141
phragmitidis, Arenostola, 217
picicorne, Agonum, 170
picicornis, Omaseus, 172
picipenne, Agonum, 170
picipes, Peryphus, 176
picipes, Tachyta, 176
pilosellae, Nasonovia, 110
pipiens, Culex (Culex), 21
plagiatum, Peryphus, 176
*planifrons, Colotes, 90
*platyceps, Gomphidia, 189–190
Platyderus, 171
pleuriticus, Harpalus, 173
Poecilus, 172
Pogonidium, 176
poicilipes, Culex (Culex), 20, 22
politus, Elaphrus, 176
polypori, Coprodiplosis, 195, 199
polypori, Lestodiplosis, 199–200
*pondolandicus, Malthinus, 85–86
*popovi, Porphyrinia, 218–219
poriae, Mycodiplosis, 195
Porphyrinia, 218–219
Potamonectes, 27–30
Procladius, 129
*productus, Eudactylocladius, 202–203
Proisotoma, 103–105
Prosthaptus, 86
proteus, Cicindela, 169
protractum, Agonum, 171
Psectrocladius, 133–134
Pseudargutor, 171
*pseudoangustissimus, Pagurodactylus, 93–94
Pseudophonus, 174
Pseudorthocladius, 134–135, 201
Pseudosmittia, 208
Psychoda, 181–185
PSYCHODIDAE, *from Samoa*, 181–188; *checklist*, 188
Pterostichus, 171–172
*ptunarra, Oreixenica, 77–78, 83
*pusa, Chionaspis, 61–64

quadraticeps, Braunsomeria, 15–16
quadricollis, Chlaenius, 169

radicola, Dysaphis, 99
*Ramachandraspis, 66–67
*ramakrishnai, Chionaspis, 64
rarotongensis, Psychoda, 183–185
reflexa, Amara, 172
revoili, Tenuitarsus, 41–43, 46, 53
Rhamphomyia, 57–58
ribicola, Nasonovia, 109, 110
ribis-nigri, Nasonovia, 109, 110, 118
*richardsi, Cryptocheilus, 37, 40
richardsoni, Opisthius, 176
*rileyi, Himatismus (Curimosphena), 155–156
riparius, Elaphrus, 176
*roonina, Oreixenica ptunarra, 78–79, 81, 83–84
*Rossimyiops, 145–146
rotundicollis, Harpalus, 174
rubricollis, Formicomus, 9–10, 147, 148
rufescens, Eodiatraea, *comb. nov.*, 180
rufescens, Formicomus, 9–12, 14
ruficorne, Agonum, 170
ruficrus, Trechus, 175
rufimanus, Curtonotus, 172
rupestris, Bradycellus, 175
rupicola, Bembidium, 176
rupicola, Peryphus, 176

saii, Omophron, 177
salebratum, Peryphus, 176
salisburiensis, Culex (Neoculex), 19
salti, Philonthus, 139, 141
Samoa, Ischnurine Odonata *from*, 119–126
*sanguinostigma, Ischnura, 123–124
sciarina, Zygoneura, 199
Sciophila, 199
scopulinum, Bembidion, 176
scopulinus, Peryphus, 176
*scotti, Colotes, 88
*scotti, Corynoneura, 209
*scotti, Metriocnemus, 129–130
Selasia, 85
semiapterus, Xanthoencyrtus, 2–3
seminitidum, Agonum, 170–171
Sericoda, 169
sexpunctatus, Cryptocheilus, 37, 39
simile, Agonum, 171
*similis, Brunettia, 181, 187–188
*similis, Pseudorthocladius, 134–135
similis, Stereocerus, 172
similis, Trechus, 169, 175
simillimus, Cryptocheilus, 37, 39
simpsoni, Culex (Culex), 21
*siolii, Hydrodessus, 56
Smittia, 206–207
sohn-retheli, Arenostola, 217
*somalicus, Cephaloncus, 86–87
sordens, Agonum, 170
sordidum, Bembidion, 176
sordidus, Peryphus, 176
*spadix, Laccophilus, 23–24
spatulatus, Formicomus, 147, 151
speyeri, Mycophila, 195
*spinosa, Limnophyes, 206
Stenocellus, 175
Stenolophus, 175
stephensii, Harpalus, 175
Stereocerus, 172
subaenea, Amara, 175
subaenescens, Amara, 175
subinflatus, Formicomus, 147, 154
Submacrosiphon, 109
substrictum, Peryphus, 176
*sudanicus, Tenuitarsus, 48–53
*sulcifrons, Colotes, 89–90
*Syntretoriana, 164–166; *key to allied genera*, 165
Syntretus, 165
szabó-patayi, Cryptocheilus, 36

Tachycellus, 175
Tachyta, 176
tamaracherriensis, Merogomphus, 189, 191
Telmatoscopus, 71
Temnogomphus, 189, 190–191
Tenebrionidae, *from S. Africa*,155–163
Tenuitarsus, 41–54
territans, Culex, 106–108
tetracolum, Peryphus, 176
*theddora, Oreixenica paludosa, 76–77
Thienemanniella, 209, 212–213
Thilakothrips, 33–34
thoreyi, Agonum, 170
tigripes, Culex (Lutzia), 19
Tiphia, 17
Tiphiidae, *African, synonymy*, 15–18
torrida, Amara, 172
transvaalensis, Tiphia, 18
Trechus, 169, 175
Trichocladius, 133
tricolor, Chlaenius, 169
trifoliatus, Culex (Culex), 21
Triliarthrus, 175
tripunctata, Tiphia, 17
tropicalis, Formicus, 147–148
tuberculifer, Formicomus, 9–14, 147, 148
*tuberculifrons, Colotes, 89

unicolor, Arenostola, 217
unicolor, Cymindis, 169
univittatus *var.* neavei, Culex (Culex), 20, 22
ustulatum, Peryphus, 176

*vagans, Potamonectes, 28–30
vanderwulpi, Pezomyia, 195
variegata, Helomyza, 199
variegatus, Notaphus, 176
venus, Ligyra, 220–222; *key to spp. of this group*, 220
versicolor, Cryptocheilus, 37, 39
versicolor, Notaphus, 176
versicolor, Stenolophus, 175
*viridescens, Psectrocladius, 133–134
voigti, Fenella, 136, 138
*vredenburgensis, Philhedonus, 92–93
vulcanus, Ligyra, 220
*whiteheadi, Rossimyiops, 145–146

Xanthoencyrtus, 1–3
Xenica, 73
Xestonotus, 174

Yezabura, 95
Yola, 24–25

Zygoneura, 199

ERRATUM.

P. 176, line 23. For "*Pheryphus*" read "*Peryphus.*"